46th Year AUGUST 2, 1906 Number 31

AMERICAN BEE JOURNAL

REV. J. G. DIGGES,

Editor of the Irish Bee Journal and author of "The Irish Bee-Guide."

(See page 655)

American Bee Journal

THE AMERICAN BEE JOURNAL

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National Bee-Keepers' Association

Objects of the Association.

1st.—To promote the interests of its members.
2d.—To protect and defend its members in their lawful rights.
3d.—To enforce laws against the adulteration of honey.

Annual Membership Dues, $1.00.

General Manager and Treasurer—
N. E. FRANCE, Platteville, Wis.

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Editorial Notes and Comments

Bees Don't Puncture Fruit

Bees are often charged with sins that they are not guilty of, and it seems to take a long time for their friends to prove their innocence. But frequently misjudgments arise from ignorance; and so, as fast as information is found through careful investigation, false judgments will be withdrawn and true estimates substituted therefor.

It has long been believed by some people that the bee is the great destroyer of grapes, peaches and plums by puncturing them and starting them to rotting. Many a time bees have been seen drinking the sap exuding from such punctures. It has taken a long time to exonerate the bee from this charge, but it is now found that most of the injury is done by crickets and June-bugs. Prof. Garman, of the Kentucky Experiment Station, says an exchange, took up this matter and set a watch to find which insects were puncturing the grapes, peaches and plums. He found two varieties of tree-crickets working vigorously at night cutting holes in the fruits named. He expresses the belief that these crickets are the chief culprits in puncturing thin-skinned fruit. One variety of June-bug was also found in the same business. Many of our horticulturists and bee-men will be gratified to learn of this new evidence in behalf of the bee.

Those 14 Frames With Brood from One Queen

There is always trouble to prevent internal dissensions in a large family, and the Editor of this Journal seems called upon to interfere between two editors of departments before any gore is shed. This time it is Dr. Miller, who gets after the Afterthinker after the following fashion:

I had not thought to mix up in the controversy between Messrs. Alley and Ferris; but when Mr. Hasty starts in to umpire the game and shows rank partiality in championing Mr. Alley (page 598), I feel that some one should umpire Mr. Hasty. So I come, perhaps at the risk of a broken head, to the defense of Mr. Ferris in what he says on page 251. I don't mean to his defense in all he says on that page—I wouldn't like to do that—only as to the point of the combined Hasty-Alley attack.

Queens that "occupied from 9 to 14 frames with brood," page 251—that's what started all the trouble, and causes the man who thinks afterward to gag at 5304 eggs in 24 hours. But, look here, Mr. Hasty, doesn't as close an observer as G. M. Doolittle stand sponsor for the statement that a queen has laid 5000 eggs in 24 hours? Perhaps, however, he wouldn't stand for the extra 304 eggs, and possibly not for the 5000 kept up as long as 21 days.

But now, honor bright, did Mr. Ferris say 5304 eggs in 24 hours? He said he had queens that occupied from 9 to 14 frames with brood, and then you take "some mathematics of the knock-down sort," on page 445, and coolly say that calls for 5304 eggs a day. Let's look at those "mathematics," page 445:

"A Langstroth frame 9x17 inches, inside measurement, contains 153 inches. There are 52 cells to the inch of comb. In 14 frames there would be 111,384 cells." And then because you think it's too big a stunt for a queen to fill 111,384 cells in 21 days, you want Mr. Ferris to "come down a cat or two" with his queens that occupy 14 frames with brood.

How about that 9x17 inches, inside measurement? A Langstroth frame is 9⅛x17⅝ outside. If top-bar is ⅞ thick and bottom-bar ¼—nowadays they are not often made less than that, and sometimes more—that leaves the inside measurement 8¼x17. But the cells being six-sided there is a loss of space all around next the wood, and besides that there is nearly always a considerable space between the comb and the bottom-bar. Let us say, however, that the comb is built clear down to the bottom-bar, and that only ⅛ inch is lost at each margin; that will leave the available inside measurement 8x16¾, or 134 square inches. At 52 cells to the square inch (I think bees naturally build more than that to the inch, but with foundation it's likely right), that makes 6968 cells in a frame, or 97.552 in 14 frames. To compass that in 21 days would call for only 4645 a day, or 659 less than the estimated 5304.

Still feel like gagging at 4645 a day, Mr. Hasty? Well, now, did Mr. Ferris really claim anything like 4645? What did he mean by 14 frames occupied with brood? What do *you* mean by a frame of brood? Place your hand on your heart and tell us whether you mean that every cell in the frame is filled with brood? Does any bee-keeper ever mean that? Did you ever see a frame of that kind? Do you ever expect to? In this locality we call it a frame of brood when as many as half the cells are filled. But if we were talking about a queen occupying 14 frames with brood, we would expect them to average something like ¾ of the cells occupied with brood. That would call for only 3484 a day, and that's about all you ought to charge up against Mr. Ferris, instead of 5304. Don't you think *you* ought to "come down a cat or two" yourself, Mr. Hasty? If you do, I'll be on speaking terms with you again. Not otherwise.

C. C. MILLER.

Before any permanent settlement of the matters at issue, two questions must be answered. One of them is the question, "What is a frame of brood?" Evidently it can not mean that all the cells are filled; what does it mean? The term is one constantly in use, and it is really important that there be some definite understanding as to its meaning. Who will tell us?

The other question is, "How many eggs a day will a queen lay for 21 consecutive days?" Don't all answer at once.

Alsike Clover Diseases on Horses and Mules

A bulletin from the Agricultural Experiment Station of the University of Tennessee has been received, which gives an account of a strange disease sometimes produced on horses and mules—not on other stock—by continuous and exclusive feeding on alsike pasture. The serious failure of red clover, caused by "clover sickness" (a good stand beginning to sicken and die in August and all being gone in September), has turned attention to alsike, which is largely taking the place of red clover.

But an exclusive diet of alsike sometimes produces a disease whose symptoms are in part as follows:

On the skin are inflamed areas, appearing at first as more or less rounded vesicular swellings, varying from ½ inch to 5 or 6 inches, or more, in diameter. The hair over the affected areas stands erect, and has a dull appearance, indicating loss of vitality. Later the skin becomes hard and puffed out, as the result of the formation of pus underneath. Finally, the deadened skin is cast off, leaving a deep, raw,

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angry-looking ulcer, which eventually heals, with the formation of a conspicuous scar, covered with more or less white hair. These changes in the skin may occur on any part of the animal, but especially on the limbs, body and croup. The eye symptoms consist of a marked conjunctivitis, with swelling of the eyelids, sensitiveness to light, and a watery discharge from one or both eyes. The mucous membranes of the mouth become inflamed (stomatitis), ulcers form, and the animal slobbers and refuses to eat.

The treatment is comparatively simple. As soon as the disease is recognized the animal should be removed from the alsike clover pasture and the wounds subjected to ordinary antiseptic treatment, such as frequent washing with 5 percent solutions of carbolic acid or creolin, and the application to the ulcers on the skin of drying powders, consisting of boric and tannic acids in equals amounts.

As bee-keepers and farmers are encouraging the cultivation of alsike generally, and as it is possible that exclusive feeding on alsike pasture may sometimes be bad elsewhere than in Tennessee, it is important to be forewarned, ready to act promptly in case evil effects should appear.

Prof. A. J. Cook, who has been spending a year in special study and investigation in Germany, is again in this country. He expects to be at the home of his son, Senator Bert B. Cook, in Owosso, Mich., until about Aug. 15, when he goes to his home in Claremont, Calif. The Professor reports having had a delightful ocean voyage, and that he loves America more than ever, since seeing the best that exists across the "Big Pond." His wife and daughter will remain a year or more longer in Germany, so that the daughter may have the opportunity in music that is so excellent there. Prof. Cook says he was never in better health, and is ready to roll up his sleeves for good, hard work again. His many friends will rejoice in his safe journey home again after spending so many months abroad.

Michigan State Fair Apiarian Exhibit.—This Fair will be held in Detroit, Aug. 30 to Sept. 7. The following is the premium-list for bees, honey, etc., which is a very generous one, indeed:

	1st	2d	3d
Italian bees and queen in single-comb observatory hives	$ 8 00	$5 00	$3 00
Carniolan bees and queen in single-comb observatory hives	8 00	5 00	3 00
Caucasian bees and queen in single-comb observatory hives	8 00	5 00	3 00
Largest and best display of bees of various races in observatory hives	10 00	6 00	4 00
Largest display of queens of various races in mailing cages	5 00	3 00	2 00
Best case of white comb honey	3 00	2 00	1 00
Best case of light amber comb honey	2 50	1 50	1 00
Best and largest display of comb honey	10 00	6 00	4 00
Best display of special designs	3 00	2 00	1 00
Best dozen jars of white extracted honey	2 50	1 50	1 00
Best dozen jars of light amber extracted honey	2 00	1 00	50
Best and largest display of extracted honey	8 00	5 00	3 00
Best display of extracted honey in granulated form	3 00	2 00	1 00
Best 10 pounds of yellow beeswax	2 00	1 00	50
Best and largest display of beeswax	5 00	3 00	2 00
Best display of special designs in beeswax	3 00	2 00	1 00
Best display of honey-producing plants, mounted	3 00	2 00	1 00
Best display of fruits preserved in honey	3 00	2 00	1 00
Most instructive display of apiarian products and of the various uses made of honey and beeswax	15 00	10 00	5 00

The exhibition of all kinds of implements and bee-keepers' supplies is invited, for which space will be provided as far as possible at 10 cents per square foot for space used. Diploma given for best exhibit.

All strains of bees to be plainly labeled and placed in observatory hives, appearance of hives to be considered.

For any further information desired, address, I. H. Butterfield, Secretary, Detroit, Mich.

The National Convention Report occupies a number of pages this week. During the remaining numbers of August we will omit it, but give another large section of it in the first number of September, and continue thus monthly until the Report is completed. The intervening numbers of the Bee Journal—that is, after the first number of each month—will contain 16 pages each week. During this season of the year the space occupied by advertisements is somewhat less, and the majority of our readers are exceedingly busy with work in the apiary and also other matters, so that possibly 16 pages per week after the first week of each month during the rest of the year will answer very nicely. By running 32 pages the first issue of each month it will make an average of 20 pages per week. This will be over 1000 pages for 1906. It will be a large volume of most excellent bee-literature. And all for only $1—less than a postage stamp per week!

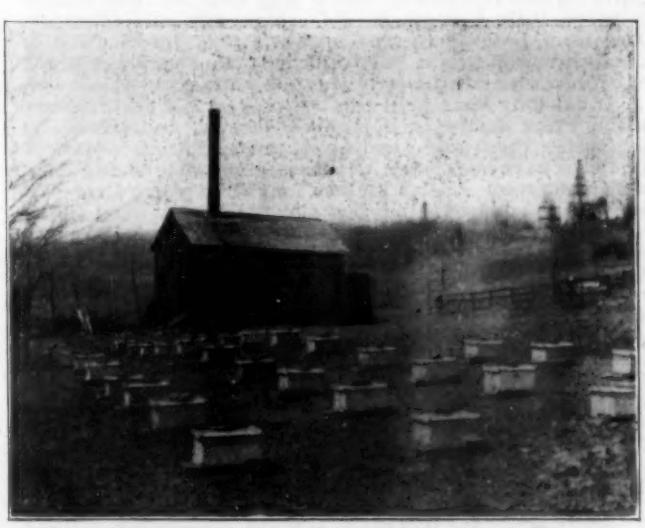
Chas. M. Darrow, of Milo, Mo., whose queen advertisement appears in this issue, says:

I used to deliver queens to the post-office in person, to get them off the same day, which, I trust, was appreciated by many. An additional carrier covering this route in the evening now permits me to get queens off the same day the orders are received, with less expense. I, therefore, marked untested down to 60 cents each, and will be able to furnish them in any quantity. So far this season I have sent out only 2 untested queens that proved to be mismated, which is less than 2 percent. Really, this is almost the same as tested queens, which sell for much higher prices.—Adv.

The Apiary of W. J. Reddish, shown herewith, is taken from a snapshot picture. When sending it Mr. Reddish wrote as follows:

My apiary is located at Dallas City, Pa., in the great oil-field. In the near background of the picture is seen a large tank and boiler-house, and in the distance a couple of oil-derricks.

Bees wintered well, and the prospects are good now for a large honey crop. May 26th I extracted one can of dandelion honey. At present (June 18th) bees are working well on white clover. In July we have plenty of basswood, and in the fall goldenrod, from which I secured 15 supers last fall.



APIARY OF W. J. REDDISH IN THE OIL REGIONS OF PENNSYLVANIA

If I could get Yon Yonson and A. I. Gleanings to make another trip to the North Pole and the Moon, I would get them to bring me back a setting or two of eggs of those big bees. I think bees of that stripe could be made to carry a bottle of natural gas with a burner attached, and could then gather honey at night as well as in daylight.

W. J. Reddish.

Appendix to Dr. Miller's "Forty Years."—All who have the first edition of "Forty Years Among the Bees" should also have the Appendix which appears in the new edition, issued recently. The complete new 344-page book, bound in cloth, is sent postpaid for $1.00; the Appendix alone for 10 cents. Or, the book and the American Bee Journal a year—both for $1.80; the Appendix and the American Bee Journal a year in advance, $1.00. Send al orders to the American Bee Journal office.

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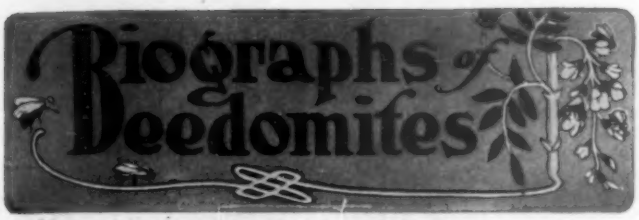

REV. J. G. DIGGES

It is with much pleasure that we present to our readers this week the picture of our brother editor across the sea, the Rev. J. G. Digges, of the Irish Bee Journal. There are only a few of the bee-papers published in foreign lands that we are able to read, and the Irish Bee Journal is one of them. There are many published in French, Italian, Spanish, German, Russian, etc., that are "like Greek" to us; but all of them, no doubt, are of interest to the bee-keepers in the countries where they are published. The Irish Bee Journal, however, is one of the most interesting that comes to our desk. Its editor, Mr. Digges, is a versatile writer and evidently an accomplished gentleman. We had the pleasure of meeting his brother, who has been a leading physician for over 30 years in St. Louis He it was who represented the Irish bee-keepers so well at our National Convention during the Louisiana Purchase Exposition.

The subject of this sketch, the Rev. J. G. Digges, was born in Dublin, and was educated at the High School there; subsequently entering Trinity College (Dublin University) in 1878, where he studied law and divinity, and graduated as B. A. with honors (Respondent) in 1882, and as M. A. in 1885. He was ordained Deacon in 1883 for the Curacy of Mohilcum-Tarmonbarry, and Priest, 1885, for the Curacy of St. George's, Belfast. He was appointed Private Chaplain at Lough Rynn—in his first parish, Sept. 1, 1885—where he still remains.

In 1885 it was that he handled his first honey-bees, when, one morning, he found on the veranda of his house a sack containing a swarm that had been left there by the wife of a neighboring cottager, as a "lucky gift for his reverence." He contracted "bee-fever" immediately, and violently, but did not in the least know what to do with the "lucky gift." He wrote off at once for literature, sent to Walton for a modern hive, joined the Irish Bee-Keepers' Association, and, in 1886, was the proud possessor of 3 colonies. In that year one colony gave 120 pounds of section honey, and returned a net profit of about $20—section honey was then at a fancy price in Ireland. Those 3 colonies, during several years, fed, clothed and educated an orphan girl, paid for her training as a nurse, and eventually assisted her passage to the United States, where, almost as soon as she landed, she married a respectable tradesman, and started nursing on her own account. (Sisters, take notice!)

Up to the year 1901 there was no bee-paper published in Ireland. Mr. Digges, as editor, then started the Irish Bee Journal, as the organ of the Irish Bee-Keepers' Association; and, as proprietor and editor, has this year carried it into its 6th volume. Few who witnessed the birth of the paper thought that it would long survive, but it has progressed wonderfully, has enlarged its size, and has enjoyed a steady increase of circulation not only in Ireland, but also in Great Britain, the British colonies, the United States, and Canada.

In 1904 he published the "Irish Bee Guide," which, originally intended to meet a want in its own country, has found its way all over the world, and has called forth letters of the warmest approval from the most distant places.

Mr. Digges is also the author of "The Cure of Inebriety," which was published in 1904, and was extensively reviewed by the press. It starts from the thesis that the drink habit is not an incurable vice, but a curable functional disease of the nervous system, and, on the principles it recommends, many patients have since been successfully treated in London, where the medical faculty has evinced much interest in the remedy. Another work from his pen has just been published, dealing with the Irish industrial question, and he has written, besides, many articles upon railway development, agricultural, and kindred subjects.

Outside his professional duties, the subject of this sketch is a busy man. It was of him that the Daily Mail (London) recently said in an article on "Some Curiosities of Directorates:"

"The Rev. J. G. Digges, of bee-keeping fame, is the most bloated pluralist among the clergy, controlling the destinies of six companies, of which five are closely connected with bee-keeping and agriculture, and the other one a railway."

He is a member of the Council of the Department of Agriculture and Technical Instruction for Ireland, a director of the Cavan and Leitrim Railway, President of the Mohill Agricultural and Dairy Company (Ltd.), President of the Irish Bee-Keepers' Federation (Ltd.), Trustee and Honorary Secretary of two Agricultural Banks, an examiner and member of the committee of the Irish Bee-Keepers' Association, a member of the Company Leitrim Committee of Agriculture, Honorary Secretary of the Athenæum Club, Dublin, and holds office on the Boards and Committees of several other companies and societies in Ireland. We should say that Mr. Digges *is* a busy man—"as busy as bees," as is often remarked. How he also manages to edit so good a bee-paper is a mystery.

The "Irish Bee Guide," mentioned before, is a book of 220 pages, aside from a number of advertising pages. It is written in a most fascinating style, and is also copiously illustrated, not only with pictures representing the appliances used in bee-keeping, but also scattered throughout its pages appear fine portraits of some of the leading bee-keepers of Ireland. The whole work is arranged in numbered paragraphs, which makes it very easy for reference. Mr. Wm. A. Pryal, of California, who received a copy of this work, was so charmed with it that he wrote the following review of it, which we are pleased to give a place here:

From the old classic hills of Ireland there was sent forth a year or so ago a work on the bee that deserves greater perusal in America than I believe it has received. In thus recommending it, I do not wish it understood that I indorse it as a manual for our bee-keepers to follow, but simply to call the American bee-keepers' attention to it as a work written by an intelligent and fair-minded apiarist—by a man who evidently has no fads or fancies to promulgate.

Viewing the book as it lies unopened one is unprepared for the feast of rich and instructive reading contained within its semi-flexible green Irish linen covers, the front one of which is embellished with the title, together with the ancient harp of Tarra; a couple of shamrock leaves and other ornaments, are in a darker green than the cloth. The title on the back is the worst feature of the work—it is too indistinct.

On opening the book one at once notices the superior quality of the paper—and not over-sized paper is used throughout, except for the portraits, these being 18 full-page cuts. The press-work is better than I have seen in any of our popular American works on the same subject. Mr. Thos. Wm. Cowan's "The Honey-Bee" is about the best book on the bee, from a printer's point of view, I ever saw, but the same author's "British Bee-Keepers' Guide Book" has not so much of the labor and expense bestowed upon it. So, as stated, the "Irish Bee Guide" is the handsomest work for general use by bee-keepers published in the British Isles or elsewhere, as far as I know.

The volume is divided into three parts, the first, covering 41 pages, deals with the bee, and disposes of the subjects by chapters. Chapter I considers the occupants of the hive; II, The Bee in Spring; III, The Bee in Summer; IV, The Bee in Autumn and Winter; V, Anatomy of the Bee; VI, Different Races of Bees; VII, Bee-Products, etc.

Part II has 6 chapters, and discusses Hives and Frames; Appliances for Supering; Comb Foundation; Appliances for Feeding Bees; Appliances for Subdividing and Handling Bees; Appliances for Honey and Wax Extraction.

Nineteen chapters and an Appendix complete the work. The chapter on the diseases, etc., of bees is concisely written, and, if it were for no other reason, the American bee-keeper should have the book just to read what the author says about these diseases. He defines each disease in one paragraph; gives the symptoms in the next, and ends by giving the treatment required for its cure. Foul brood is treated more elaborately than any other bee-disease, some 10 pages being used to cover the subject.

The illustrations for the most part are half-tone blocks with a sprinkling of zincographs, or pen-and-ink drawings. Many of the half-tones are reproductions from photographs by the author, who, along with other accomplishments, seems to be a good camerist. His photo of "Hives on Flags," facing page 80, is one of the most realistic pictures of hives I ever saw. In this respect Editor Digges, of the Irish Bee Journal, can enter the same class with E. R. Root and W. Z. Hutchinson, editors of two of our well-known bee-papers.

This causes me to digress. Why do we always have to write or speak of a *bee*-book or a *bee*-paper? Why not a *honey* or *wax* book or paper? Or, perhaps, better still, an *apiarian* paper? We never hear any one say a *cow*-book or *cow*-paper. It is a dairy-paper, unless the work is especially on the diseases and general treatment of the animal, and then it is truly a *cow*-book.

To show the masterly style in which the author uses the English language, I should like to quote some passages from the volume, but lack of space forbids. Generally the language is concise and plain. But at times it is poetic, and is only exceeded by that of Mr. Maeter-

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linck; the latter, however, not being English, but a native of Holland or Belgium, I believe.

Another feature of the book is that among the portraits of bee-keepers I notice those of several Roman Catholic clergymen. The author, I should suppose, is a Protestant minister. It would seem that the old animosities between Catholics, Presbyterians, Episcopalians and other sects are fast disappearing in that island that was cursed by religious strife since Cromwell made an unhappy land of it by his iron sway and unjust governmental innovations.

May the busy bee and the author of the "Irish Bee Guide" cement the good feeling already begun, and bring peace and plenty to the Green Isle of saints, warriors, statesmen, and, as some humorists have said, "American policemen." W. A. PRYAL.

The "Irish Bee Guide," by Rev. J. G. Digges, M. A., editor of the Irish Bee Journal, and expert member of the Examining Board of the Irish Bee-Keepers' Association, is sent postpaid for $1.00. Orders may be sent to the office of the American Bee Journal, or to the author, at Lough Rynn, Dromod, County Leitrim, Ireland.

The "Old Reliable" as seen through New and Unreliable Glasses.
By E. E. HASTY, Sta. B. Rural, Toledo, Ohio.

Bees Destroying Cells With Live Queens

In his racket with Mr. Alley, about bees never destroying cells containing live queens, Allen Latham seems to "make good" in the main. Perhaps we may concede to Mr. Alley that the queen *usually* makes the first puncture, and often stings as well—with some contras in the first case, and many in the second. Natural to suppose that imprisoned bees would be much more given to naughty tricks than free ones. I have noticed that sometimes bees will spare an alien cell *not sealed over yet*, when they are death to sealed ones. (Think it absurd to work so hard digging a hole when the top is still wide open.) If I should say bees never destroy a good-sized larva in an open queen-cell, I wonder if Allen Latham would "pitch into me." Page 504.

Honey Ripe Before and After Sealing

Others, also, as well as Mr. Dadant, have told us that honey is sometimes sealed before it is ripe, and sometimes ripe before it is sealed. Sound, I guess. But here's a thorny club for the fellow who always says that when he wants to extract green honey. Good thing, among the good things of the article, is calling our attention to this fact. A lightly screened tank in a hot room can oft be had with no extra expense worth mentioning; and more ripening surely won't hurt the honey any. By the way, I protest this use of the word "ripening" as a misuse. Ripening takes place inside the hive. What takes place in an open vessel outside is something else, and inferior. At least three important elements of the natural process, practically, are not reproduced outside the hive. Page 504.

Early Pollen—Bees Value Sound Pollen

Thanks to Mr. Doolittle for his description of skunk-cabbage bloom. Although it grows not far distant from me, I have never seen its bloom (almost ashamed to say). Through a wide region of country, I think tag-alder is the first pollen-source. Here it usually gets through before any bees get out to gather, but not always. Hazel is also very early. Wonder if Doolittle is *sure* that soft-maple pollen has a reddish tinge. Claytonia's bloom at about the same time, and yield lots of prettily tinged pollen—little, insignificant creatures that they are—on the ground beneath the trees.

Guess Doolittle is right that bees never throw away sound pollen. And I will venture still further to the conclusion that for the keeper to take out combs of pollen from the hive, or to move it around in the hive, is *usually* useless meddling. Page 505.

Floats Used When Feeding Bees

I think A. H. Snowberger's ideal float will eventually get so water will come on top, and then after a bit sink altogether. A great invention just dawns upon me that I think will save the situation. Get four thrown-away medicine bottles—the pinched, flat, untruthful kind that say, "I hold lots of salvation" (two lies neatly told). Cork them tightly, and put one under each corner of the sinking float. No need to clean the dirty things inside—but don't let any of the medicine remain daubed on the outside—too vile an insult, and possibly harm, to useful and blameless creatures. Should either bottle prove too buoyant, a little stone of suitable size can be laid over it. Page 509.

A "Hybrid" Suggestion and Question

Second your motion! Let Ernest try hybrids, and see if hybrid chickens won't stand editorial manipulation. You see I'm "in it," too. Took charge of three big goslings (as the only way in sight to keep them out of unendurable mischief) and one is dead, and one I lamed on a tame-goose chase. The demise is charged to my account—and the lameness I have not much chance to plead not guilty on. As there are hybrids and hybrids, let him preferably take Old Blue Hen crossed with original, eat-off-a-barrel Shanghai rooster. What would be the proper hybrid gosling for me? Page 523.

Italians Swarmed and Blacks Worked

So G. W. McGuire's experience as a beginner was that his new Italians wasted their energy in swarming, while his old blacks kept their heads level and stored some honey. I reckon Mr. G. was not the only Columbus to discover that island. Page 510.

Those Two Long Fellows

On the title page of No. 25, I gladly ken the faces and figures of my two "companions in tribulation," the two long fellows. "Long may they wave." No; long may they be up "the staff," but never may they wave.

Two Slumbering Secrets

'Nother secret now. Grand total of two in our possession, or tempting our possession. How does Davenport prevent swarming? Why did the St. Croix fellows saw themselves off? Which secret would you give the most for? Page 521.

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Swarming, After-Swarms, Queen-Rearing, Etc.

BY EDWIN BEVINS.

MY best colony worked for comb-honey had, on June 27, completed 120 sections. On that day I put on a super filled with 8 "go-backs," and 16 sections with starters of foundation. This super is now (July 13) about ready to be removed, and has below it another super with 16 "go-backs" and 8 sections which were full of empty combs when put on. This super is well on towards completion. The colony has not swarmed. Does Dr. Miller think this queen will do for a breeder? I have some other colonies which have made nearly as good a record as this one.

I run my bee-yard without making any effort to prevent first swarms, except to give plenty of breeding-room before the flow, and plenty of super-room afterwards. I have had 15 or 20 swarms from about 100 colonies. I work many ways to prevent after-swarms. One of the most successful is to put the swarming colony on another stand. If set close beside the swarm now on the old stand, I have the choice either to unite the bees of the old colony to the swarm later, or, if young queens are wanted, nuclei can be made by dividing the combs, giving each nucleus a comb with 1 or more queen-cells on it. I have reared quite a number of young queens in this way this season. I have practiced in a small way cutting all of the queen-cells but one out of the combs of swarming colonies. None thus treated have sent out second swarms.

A few hives from which swarms issued I did not, for various reasons, care to remove to other stands. On these I put another hive filled with brood-combs. This was done for a double purpose. One purpose was to get the combs out of the way of the moths, and in addition to this I had a vague idea that they would have a tendency to prevent the issuance of after-swarms. No swarms have issued from colonies so treated. From this no large inference can be drawn. No bee-zinc was used. The new queens will have a large range, and I think there will be some big colonies before winter, and that they will have plenty of honey to keep them, if there is a fall flow.

I had quite a number of queens that did not rear bees enough to work in supers at all. On some of the hives I had hives filled with extracting combs, and zinc below. Taking a hint from Doolittle's "Scientific Queen-Rearing," I put some brood in this upper-story to attract the bees, and then after swarming began I put in either a comb with queen-cell on it, or else a cell which I had cut from a comb. These cells were invariably accepted. After the issuance of the young queens I removed the zinc, and, if Mr. Doolittle is correct, those colonies are requeened. I shall do a lot of requeening this season. I shall use all queens reared in nuclei from swarming colonies, and shall rear some more in my own yard if I have to feed in order to do it. (The honey-flow has been slow for about a week). In my case there is nothing to account for the difference in a surplus represented by a cipher and one represented by 120, except the difference in queens. Other factors count in some instances, but no other factors were in sight here.

I find it particularly unsafe to keep a queen that has done uncommonly well in a colony that has been worked for extracted honey. One colony so worked last season became very strong early this season. Just before the time for supering an examination showed that the colony, although quite strong, had no brood, sealed or unsealed, and there was no sign that the queen had been superseded. I gave combs of unsealed brood repeatedly in order for the bees to rear a queen, but they persistently refused to start queen-cells. Later I found brood in one of the combs which I had not given them, and so it seems they did supersede the old queen, but so late there could be no surplus from the early flow. In other cases I had queens that began laying and had two or 3 patches of brood the size of a hand, and then died. On the whole, I conclude that it is safer for the apiarist to do a good deal of superseding himself and not wait for the bees to do it.

The American Bee Journal at one time gave the unqualified advice to break up or unite all colonies that are found queenless in spring. Miss Wilson gave the same advice, but qualified it later. I had some queenless colonies which I united with some having queens. Two colonies which were strong in bees I requeened with purchased queens—1 a tested queen from this State, the other an untested from Texas. These colonies have done some work in the supers.

I will refrain from saying anything more on the subject of getting unfinished sections cleaned up in the fall. Miss Wilson's latest utterance on the subject reveals the cause of her and Dr. Miller's failures to get satisfactory work done. Satisfactory work need not be expected without the use of the uncapping-knife. Leon, Iowa.

15—Dadant Methods of Honey-Production

BY C. P. DADANT.

A READER of American Bee Journal puts this question to me, after reading what I have said about ripening honey: What would you advise me to use, a tank for extracted honey, or closed receptacles, or what?

This question cannot be answered in a few words, because much depends upon the condition of the honey when harvested. If you allow the honey to become well-ripened before extracting it, it is absolutely unnecessary to put it in an open vessel. Of course, if you have an open tank in a well-sheltered position, so that no flies, ants or other insects can get access to it, this is as good a receptacle as you may wish for, provided, however, that you do not let the honey remain in it long enough to granulate. If you allow honey to granulate in a large tank, you will have considerable trouble in removing it.

We use galvanized-iron tanks whenever we deem it advisable to keep the honey where it may continue to ripen. The tanks we have used for this purpose are also used for wine-making. They are 4 feet in height and 5 feet in diameter, and hold 4,500 pounds, with a honey-gate of best quality near the bottom. The tank is slightly inclined towards the front so that all the honey may be drained out. For a small apiary smaller tanks would be good, say 3 feet by 3 feet. But when such a tank is full, it cannot be moved, and must be emptied on the spot. If you allow the honey to granulate in it, you will have difficulty to remove it.

In our own practice, with large apiaries in different locations, we have found it necessary to put our honey in such receptacles that we could remove it at once from the farm on which it had been produced. If we left honey in a tank on a tenanted farm, we would run some risk of not finding it all there when we came again. Besides, in an out-apiary, it is difficult to secure such rooms as are entirely fit for keeping honey. Mice often have access to the honey-room, and, on the whole, we have found barrels to be the most satisfactory package, as first receptacle for the crop. These may be hauled away at any time, and when bunged up are not likely to be tampered with. They are absolutely proof against insects or mice, as well as children.

But we are very particular as to the kind of barrels to use. It is out of the question to pick up an old water-barrel or a cheap syrup-barrel for honey. Neither will new barrels do, except very expensive ones. The best barrels we ever used are "empty alcohol barrels" which may usually be secured from drug-houses. These barrels have been emptied of their alcohol for medicinal purposes. They are absolutely tight, for alcohol will evaporate through the staves if the barrel is not prepared purposely. Usually they are coated on the inside with some sort of gum or glue which will also keep the honey from leaking out. But the barrel must be kept dry, for just as soon as it is exposed to dampness the wood will swell, and whenever it dries again it will begin to leak. This dry condition is also necessary for the good of the honey, which is very hygrometric, and will gather moisture even through the staves of a barrel.

The advantage of barrels is in the handling at any time. We can also keep honey in this shape from year to year.

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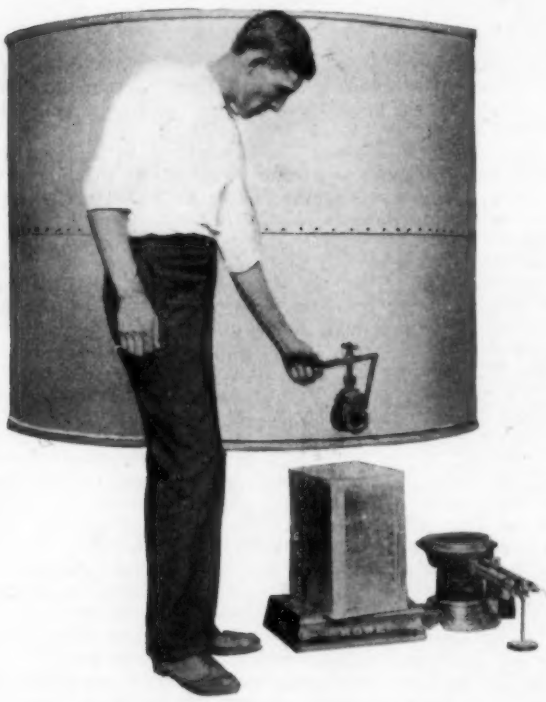
After several good seasons it has happened to us that we would not reach the bottom of a pile of barrels for 3 or 4 years, and at the end of that time we found the honey just as good as on the first day. It is quite important to be able to keep honey from good seasons when it is cheap, for bad seasons when it is high.

If our honey granulates in the barrels, it is not difficult to remove it. We mark the head and the staves with chalk and a cold-chisel, so as to be able to replace the head in the same way, then the hoops are chased off one end, and the head removed by the help of a strong gimlet screwed into the center of it. The honey is then dug out of the barrel with a clean spade. We have often taken the head out of a barrel of honey, removed the honey and, putting the head back into the barrel, have poured the liquid honey into it again. But this must not be done while the honey is hot, because its heat will shrink the staves enough to cause leakage, even if the staves are quite dry.

I must say, however, that most of our honey is put up into small packages before it begins to granulate, for by this



DADANT TANK FOR STORING HONEY.

method we save quite an amount of unnecessary work. The handling of granulated honey is always extra labor. If we could know in just what size of packages the orders would come, it would save considerable work to put it up in that shape, just as soon as we have it settled and skimmed, to have it perfectly clean. But sales change from one year to another, and although a goodly portion of the honey may be put up in 5 and 10-pound tins, and another portion may be put into 60-pound cans, yet we find it necessary to wait for orders before putting up the bulk of the crop.

The reader will thus understand our reasons for using barrels. But in a small apiary, one or two small tanks, covered with muslin, will probably be the most satisfactory packages for receiving the crop at the time of extracting. Whatever you do, by all means avoid cheap barrels, for they will leak all summer and will waste honey until the honey is granulated.

If you have good sale for honey in tins of different sizes, let the honey settle in the tank for a few days, then draw it off into suitable packages. Do not buy second-hand vessels of any kind. Honey ought to be put into new tin vessels where it will keep good and wholesome. Good tin will not rust under honey, but iron will. The edge of a sheet of tin exposed to the honey will sooner or later make a dark streak in the honey. Lead-tin will not do. It must be bright tin.

Tin vessels will leak honey when they would not allow a drop of water to escape. This is probably because honey is heaveier and has less capillarity than water. If you discover a small leak in a tin vessel full of honey, do not waste time in emptying it out, but just rub a little tallow-wax (beeswax and tallow mixed together by melting) over the spot. This will stop the leaking. Understand, however, that this is not meant for such things as nail-holes or large cracks, but only for imperceptible leaks, such as are often found in the seams of tin vessels.

When removing foam or scum from honey, you will find this to contain mainly small particles of comb, cappings, and perhaps now and then a bee or a bee's wing. This foam is put into a jar, and, after a few days, skimmed again, when the entire amount of dirty honey from a whole tankful will be reduced to a gallon or less, which may be fed to the bees that are most in need of help. Hamilton, Ill.

Cutting Queen-Cells to Prevent After-Swarming

BY E. J. CRONKLETON.

ON page 901, I see the question asked Dr. Miller, "Will cutting out of all queen-cells but one, a few days before a colony swarms, prevent afterswarms?" The Doctor's answer is, "Tradition says the plan is successful, and I have no proof to the contrary."

Now, I will try to brace the Doctor up a little. Away back in the '80's I was in my prime in the bee-business, and there was a great cry for a method that would prevent afterswarms. Well, I gave the matter a little thought and it resulted in producing the plan of cutting out all the queen-cells but one. I tried it for a couple of seasons and it proved a perfect success with me. So in order to be sure before publishing it, I appointed Dr. Mason of Ohio, and Mr. Demaree of Kentucky, and two others whom I do not remember now, to experiment with it and report results. The 2 succeeding years were very poor seasons for making such experiments, and in the meantime some one took my line of thought, and I think it was published. I don't think I ever published it. So you see, Doctor, I came very near being the author of this plan, and should be able to tell why it works as well as it does.

Well, when a colony swarms every bee that has the impulse on her goes with the swarm, and there are but little left in the old hive, but young bees, some drones, and plenty of brood, and queen-cells. Just as soon as you have the swarm attended to, go right to the old hive and cut out the queen-cells. Don't wait 3 or 4 days; do it immediately. Queens hatch out soon after swarming; jealousy occurs, and then the impulse is upon them, and then you are lost, and Mr. Davenport is afraid to tell you how to proceed, and I can not tell you, either.

Now, the benefits of this procedure with me is 1 and sometimes 2 supers of honey from this old colony; otherwise you get 1 or 2 swarms of bees, which you do not want.

This plan does not interfere with the nature of the bees, and it is based upon scientific principles. If rightly practiced it is a perfect success. At least it is with me.

It is a curious proposition that Mr. Davenport presents to us on page 603, about preventing swarming, and I think he is laboring under some delusion. I don't believe a word of it until he comes right out square-footed and tells us all about it. I think there are a great many of us old fellows who have studied bees for 20 or 30 years, and know pretty nearly what a bee will do under any and all circumstances. We are ready to believe almost anything if it is proved up. We deny everything in this case, and insist on more proof. Dunlap, Iowa.

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Report of the Western Illinois Convention

The meeting was held in Galesburg, Ill., and was called to order by the President, J. E. Johnson, about 9 o'clock a. m., May 16, 1906. Instead of a President's address the following questions were given for discussion:

HONEY PROSPECTS—INCREASING THE HONEY FIELD

"All things considered, what is your prospect for a good honey crop this year?"

"How might we make our locality yield more honey?"

Some of the members thought the prospect fair, but most thought it poor to very poor, owing to the absence of white clover.

Mr. C. P. Dadant said we might improve our locality by sowing sweet clover and some other honey-plants, and thought that much good might be done by getting farmers to sow alsike clover along with their timothy and other grass seed.

Nearly all members reported the heaviest winter loss for many years. Mr. Cave reported only 5 or 6 colonies lost out of 170 wintered in the cellar. Mr. Woods lost very heavily in the cellar. Frank Moore reported 30 per-cent loss out of 80 colonies. Some lost as high as 75 per-cent. J. E. Johnson reported nearly 30 per cent loss in outdoor wintering, but 12 colonies put into the cellar came out in fine shape. All in the cellar had young queens bought of queen-breeders. The fine Punic queen imported from England, was among those lost in outdoor wintering, and he regretted very much not having wintered that colony in the cellar. Those in the cellar consumed only about one-third as much honey as those wintered outdoors.

REPORT OF THE FOUL BROOD INSPECTOR.

Mr. J. Q. Smith gave a report of his work as inspector, and said he had met with success in treating foul-brood, and as yet had encountered but very little opposition among bee-keepers in examining apiaries. He favors the appointment of deputies in different parts of the State to treat bees, as in that way more work can be done, and more good accomplished with less expense. He also gave his method of treating foul-brood. Every bee-keeper in the State of Illinois who has foul brood among his bees, or any bee-keeper who has neighbors that have foul-brood among their bees should correspond with Mr. Smith, at Lincoln, Ill., and he will give them aid. He will either come and treat them himself, or see that they are treated properly.

VALUE OF WORKER-COMB.

Mr. Dadant gave an excellent talk on the value of good worker-comb, and illustrated how the good patches of worker-cells could be cut by pattern out of a frame having too much drone-comb and inserted in other frames having the same, so that 5 or 6 frames of bad comb could be made into 4 or 5 frames of good worker-comb, and thus any one having a lot of bad combs containing too much drone-comb could fix them over into good worker-comb without expense, and thus get comb as good as though full sheets of brood foundation were used.

Different questions were discussed, some of which were very interesting and profitable to all. The election of officers resulted in the same officers being re-elected.

It is hardly profitable for me to take up more space in the American Bee Journal with this report, except to say that a communication was read from the Secretary, J. Arthur Smith, of the Connecticut Association, with a copy of the resolutions adopted by that Association in regard to the purchase of bee-supplies. This matter was discussed at some length and the Western Illinois Association is heartily in sympathy with the matter of co-operation and extends to the Connecticut Association its thanks for being interested in our Association. The Western Illinois Association is ever ready to extend the hand of fellowship to all other bee-keepers' associations, and is ready to coöperate in any movement which is for the betterment and benefit of the every-day bee-keeper. We have been enjoying the benefits of coöperation in our own Association. But while we believe in coöperation, we don't believe in abusing the manufacturers, as they are like the rest of us. They want to make all they can, but it is our business to see that we are not the victims of high prices. So we don't talk so very much, but we "saw lots of wood," and have been enjoying good goods at low prices for about 3 years.

Our next meeting will be held in the county court-room at Galesburg, Ill., in September and we want a lot of Illinois bee-keepers there who have not been there before, and any from other States that will come. Our wives are going to bake a lot of cakes, cookies, etc., using honey instead of sugar. They will also bring jellies, preserves, jams, etc., in which honey forms the sweetening part, and will exhibit for the benefit of the bee-keeping industry. If you are good, you may sample some of them. In addition to this, Messrs. C. P. Dadant, George W. York, J. Q. Smith and others will be present and contribute to our profit and benefit. You can't afford to stay away. Come and be welcome. The exact day is not set, but it will be duly announced in this and other bee-papers.

J. E. JOHNSON, *President.*

NATIONAL AT CHICAGO

Report of the 36th Annual Convention of the National Bee-Keepers' Association, held in Chicago, Ill., Dec. 19, 20 and 21, 1905

[Continued from page 641.]

Mr. O. L. Hershiser presented the following paper on

WAX-EXTRACTING METHODS AND THEIR FAULTS

Wax is the most valuable of apiarian products, because it commands the higher price; and for the further reason, that it may be kept indefinitely without injury to its properties. Moreover, its market value is comparatively stable. Although a product of great value, comparatively little attention has been given to its production until quite recent times. The only explanation of the lack of interest in wax production is the fact that the product from a single apiary is small. Formerly the bee-keeper had but one apiary, and that rarely exceeded 100 colonies. The honey-extractor was not in existence, and, hence, there was no wax from cappings. It is doubtful if the wax product before the era of modern bee-keeping, which may be said to have commenced with Langstroth, exceeded one-half pound per colony under the most careful methods by the best apiarists. A close observer, Mr. W. L. Cogshall, estimates that the wax-product under the present methods of production, is at the rate of 12 pounds to every 1,000 pounds of honey. In 1893, Mr. Mercer, of California, produced 100,000 pounds of honey, and about 2,000 pounds of wax, which would be at the rate of 20 pounds per thousand. Much depends upon the thoroughness with which the bees are allowed to cap the honey. It may be remarked, in passing, to those who may feel disposed to save time and pounds of honey by extracting before it is sealed, that they lose in wax more than they make up in additional pounds of unripe nectar, and are losers in the end both in dollars, and in conscience, by reason of failing to allow the honey to reach perfection in the natural way.

Until within quite recent times the most common method of producing wax was to place the bee-comb within a bag, immerse the same in a kettle of boiling water, and when the wax had melted and floated to the surface, skim it off or allow it to form into a solid cake before removing it. Good wax was thus obtained, but, obviously, it was a wasteful method; the amount of wax thrown away with the slumgum or refuse being from 25 percent to 35 percent of the weight of slumgum.

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The extracting of wax was a messy job, and because of this disagreeable feature, various other means of obtaining it have from time to time been devised, but classified with reference to the principles involved, they may all be brought under three heads, namely, the sun or solar; the steam and the hot-water methods. Practically there is but one solar method, but of the others, the steam and the hot water, the variations and the combinations are too numerous to mention in detail.

The solar extractor, with which most of you are familiar, is an excellent method of obtaining wax from cappings. The wax is of superior quality, which is attributable to the bleaching power of the sun, but mostly due to the fact that cappings are nearly pure wax with very little dark coloring matter in them.

For extracting cappings the solar is, perhaps, the most economical, as there is no expense for fuel, and no time required in its operation, except to fill it and to remove the wax. Moreover, in the extracting of cappings the amount of slumgum resulting is very small. When it comes to extracting wax from old combs the solar method is about the least desirable. Some wax can be obtained, but scarcely enough to pay for cost, maintenance and operating the machine. The difficulty with the solar method, in extracting old comb, is that the latter is usually largely made up of cast-off cocoons of the larval bees, pollen, propolis and other foreign materials, which act as a sponge to absorb and hold the wax, preventing it from flowing out into the receptacle when melted. The extractor becomes choked with slumgum from each filling, and this refuse contains from 25 percent to 30 percent of pure wax. The percentage of wax remaining in the slumgum from cappings is even higher, but the small quantity of such refuse makes it of little consequence.

The solar extractor is perfect as far as perfection may reasonably be expected in it; that is, to get out all the wax that will drain off it by gravity. It is simple and cheap to construct and operate, requires no artificial fuel, and is no more mussy than any other method.

But a good, modern pressure-machine will do the work of extracting both the old comb and the cappings, and such a machine should be used by every apiarist, the solar method being supplemental thereto.

A method somewhat similar to the solar is the placing of the comb in an oven, on a screen, or a strainer, over a receptacle, so the wax will collect therein.

This method requires artificial heat, like the bleaching influence of the sun, and is open to all the faults of the solar method. Obviously, this process is slow and tedious on account of the limited capacity of the average oven.

The wax-extractor much used about 20 years ago, and through false economy still retained and used by many beekeepers, consists of a tin can divided into two compartments—a small one below to contain water, and a large one above within which a wire-cloth or perforated-metal basket, for containing the old comb and cappings, is placed. Means for steam to pass from the lower into the upper compartment is provided, and a spout at the lower plane of the upper compartment is so placed as to drain off the wax. In operation the perforated-metal basket is filled with water and placed over the fire. Steam is generated and as much wax as will drain out by gravity is obtained; that which remains in the slumgum being nearly as much as that left by the solar method. The last above-described method is, in the opinion of the writer, very little, if any, improvement over the primitive bag-and-hot-water method first mentioned.

A great improvement over the method last described is found in the Ferris extractor. It is rectangular in form, and is composed of from one to three units, like the other. These units are long and narrow, which facilitate the flow of wax. This machine has a compartment below for water from which to generate steam, and the compartment above within which is a wire-cloth basket to contain the wax-yielding materials. As first manufactured the wax drained off by gravity, but, subsequently, pressure, by means of a screw and follower, was used, resulting in a largely increased percentage of wax. To obtain the best results the screw must be taken out, the follower removed, and the slumgum raked over to expose new surfaces, and again pressed; and this operation repeated several times or until no more wax can be obtained. The fault with this machine, in the writer's opinion, is that the follower and screw are too frail, resulting in their speedy destruction. Again, in this method, there is a certain amount of wax held by the slumgum, by capillary attraction, which no amount of pressure will expel. In my own operations, by an improved method, I have found the amount of wax that could be obtained from this slumgum to be over 15 percent of its weight.

Another form of the steam process is found in the Root-German wax-press, and with this I feel safe in saying you are all familiar, either by having operated it, or in the study of the machine in bee-supply catalogs, or in advertisements in our bee-periodicals. It has the merit of being compact and powerful, and it has satisfactory capacity. In my judgment, there is no better steam method in use. I believe it is recommended that the steam be combined with the hot-water method, by first boiling the comb or slumgum and then pressing it while under steam. In order to get the wax out clean it is recommended to take out the plunger or follower and also the slumgum, rake or stir it over to expose new surfaces, and press again; repeating the operation until no more wax can be obtained. This, obviously, is a mussy operation. However, while mentioning the good qualities of this method, I desire to note an exception to the widely published statement by the manufacturers of this press, that by its use "You can get every particle of wax out of old combs."

Having extracted several parcels of slumgum which had previously been treated by the German method, my experience is that several particles of wax still remain in this refuse. In two careful tests which I made of refuse from the German press, I obtained from one parcel 7 percent and from the other 11 percent of its weight in pure wax. I desire to go on record with the statement, that, so far as I have been able to ascertain, no machine with any amount of pressure will expel every particle of wax, when economically operated. I am prepared to say, however, that it can be accomplished economically to within less than 1 percent of the weight of the slumgum.

Messrs. Hatch and Gemmill have done much towards initiating improvements in wax-extracting methods, and I take pleasure in acknowledging that the publication of their experiments was what inspired me to make researches in this line. Not having had the time or opportunity to look up past records, I am unable, I fear, to describe the Hatch and Gemmill methods correctly. However, they are essentially hot-water methods, the comb first being boiled then placed in the form of a cheese with burlap or some other suitable cloth to retain it in place, and screw-pressure applied. I then believed, and still believe, that the hot-water method offers the best possibilities, and it has been along this line that my experiments have been made.

The pointing out of faults in methods implies that improvements are possible. All the methods described have more or less merit, and by using that which is good in them, with some added new features, an ideally perfect wax-extractor is possible. To produce this perfect machine cognizance must be taken of certain laws and physical properties of the various combinations of elements with which we have to deal in the operations. Specific gravity, adhesion, capillary attraction, absorption, etc., must be advantageously used or they will, and do, operate to our disadvantage. For example, take a sponge, saturate it with ink, or any coloring matter; now subject it to the most powerful pressure, and you cannot expel all the coloring matter. Why? Because capillary attraction holds it with a giant grip. But dip the sponge in water and press again and you will expel more of the coloring matter, and if you will repeat the process a few times you will get it clean of all color. The slumgum is sponge-like, and in a similar manner the wax must be washed out. Again, the specific gravity of wax being less than water, if we do our pressing under the surface of hot water the wax will float to the surface and thus be out of the way where it will not be re-absorbed by the slumgum. The masses of slumgum should be comparatively thin in order that the wax may more readily be expelled. It is not possible by the ordinary process to extract all the wax from the mass of slumgum for the reason that the interior parts thereof are not subjected to the same compression as the outside portions, the elasticity of the mass opposing and diminishing the actual pressure. Again, as the surface of the mass becomes hard and compact, the escape of wax is impeded. It follows that the interior part of the mass of slumgum is never so cleanly extracted as the exterior portions. Moreover, the power required to compress the mass increases greatly towards the

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end of the operation, as the more the mass is compressed the more solid and less impervious it becomes, especially on the surface of the mass, and hence the greater the force necessary to expel the remaining wax; and finally capillary attraction will hold a portion of the wax and moisture which it will be impossible to expel with any great amount of force or pressure.

So it is obvious, that, with methods heretofore in use, a certain amount of wax is locked up, as it were, in a safe, requiring a certain combination to open and release it. The writer claims the discovery of this combination, the principles of which may be surmised as follows, namely:

A construction in which the masses of slumgum within the device should be in comparatively thin layers, so that the wax has the shortest distance possible to move to become free therefrom.

A device in which the mass of slumgum can be pressed while immersed in boiling water so that when the wax is freed it will float to the surface.

A wax-extractor in which the pressure may be intermittent, and so arranged that when the pressure is released the slumgum or material may take up water like a sponge, which can then be readily expressed to carry out more wax and this operation repeated until all the wax has been expelled.

A wax-extractor in which the condition shall be the best possible for the slumgum or material operated upon to take up water for the displacement of the wax.

A structure which readily and automatically separates the various layers of material operated upon and relieves the pressure therein when the press is released, so that the slumgum may absorb the water like a sponge in large amounts.

In practice the cheeses of slumgum rest on surfaces of wire-screen, the bottommost one of which rests on springs capable of exerting several hundred pounds of pressure, so that when pressure is applied the springs will continue to squeeze the masses of slumgum as the wax and water are expelled.

There should be several masses or cheeses of slumgum, each separated from the other by a slatted frame covered with wire-screen with a spring at each end to separate automatically the several masses or cheeses when the pressure is released. Above the uppermost cheese is a follower against which a screw works. The cheeses and slatted frames are contained within an iron frame-work which in turn is contained within a boiler of sufficient depth to immerse the cheeses in water. The water is boiled until all the wax in the slumgum is melted. Pressure is then applied, gently at first, to allow the wax and water to run out gradually. The wax floats to the surface where it will not be reabsorbed by the slumgum. The pressure is now released and the cheeses separate, allowing a free access of boiling water. Pressure is again applied and as the hot water is pressed out it brings more wax with it, which floats to the surface. The process of intermittent pressure is continued until the work is complete. By this method practically all the wax may be easily obtained; and in order that I may not be misunderstood I will construe "practically" to mean that not more than 1 percent of the weight of the slumgum, when the extracting is finished, will be wax. That is, in every 100 pounds of slumgum there will remain less than 1 pound of wax which this process will leave if directions are carefully followed. One test of slumgum, after treatment by my method, failed to reveal more than ⅝ of 1 percent of wax, and the cheese from which the test was made weighed between 25 and 30 pounds and was 2 inches or more in thickness. It is not recommended that the cheeses be so thick when the pressing is finished, as the thinner the cheeses are the cleaner the work.

It will be observed that there is no opening of the extractor after it is filled, until the work is complete; no raking or pawing over of the slumgum to expose new surfaces and no excessive squeezing. The wax simply comes out with the water and floats to the surface under moderate pressure where it may be run off through a spout or be skimmed off with a dipper.

Great strides in advance have been made in apiculture continuously ever since the awakening which dates from Langstroth. Wax-production did not receive the attention its importance merited until Hatch, Gemmill, Ferris and the A. I. Root Co., took hold of the proposition in earnest less than a dozen years ago. Much has been accomplished in the introduction of better methods, but the bee-keeping fraternity will not be content until it is able easily to obtain all the wax that can possibly be produced.

Have you 100 colonies of bees, and are working and mussing along in a primitive fashion, trying to save the expense of a modern wax-extractor? If you are so doing, you are wasting, at a low estimate, the price of a good extractor every two years, which means that an investment in a modern wax-machine is worth annually at least 50 percent, besides the convenience in using it. If you have 200 colonies of bees you save the price of the extractor every year.

There is no doubt that over 25 percent of the wax heretofore present in old combs and cappings has been thrown away. In the aggregate, apiculture in America has thrown away hundreds of thousands of dollars worth of wax during the past 25 years. It is time we cease to waste our precious substance. Let's save our wax; it is needed in the sciences and industries, and a good market is always in readiness to take it.

O. L. HERSHISER.

Dr. Miller—Mr. Hershiser spoke of having a dish in an oven. I would like to know whether he speaks from experience, from observation, or from hearsay with regard to that?

Mr. Hershiser—Heresay. I heard Mr. Abbott speak of it.

Dr. Miller—That would be so exceedingly objectionable. In the first place there would be the danger whenever the wax was melted down in the bottom, of it being over-heated. In the next place there is a very close relative of that, so that I think likely he has got them mixed in some way. That relative is putting a dripping pan into the oven, with one corner cut open and projecting out of the oven, raised a little at the back end, and the wax dripping out into the dish outside. That will hold 4 times as much as the machine mentioned, and be perfectly safe; and while I would not think of speaking of it as an important thing for rendering wax on a large scale, for very many who have only a little to do it is a method not at all to be despised.

Mr. Hershiser—If Dr. Miller would refer to the proceedings of the Chicago-North-western convention, two years ago this winter, when Mr. Huber Root had a paper on "Wax-Extracting," he will find that what I mentioned in reference to the oven process was described by Mr. Abbott.

I want to say another word; that the idea of using springs in the bottom of the extractor in order to continue the squeezing after you have turned the screw down, I got from what Dr. Miller demanded should be a part of a wax-machine, at that same meeting.

Mr. Arnd—This press Mr. Hershiser is talking of, is at our place of business. I think it could be demonstrated.

Mr. Hershiser—I have it up there. It is the first machine I ever made, and it is not a beauty, but it is effective. If any of you would like to see it you can go up there and look at it.

Mr. Sherburne, of Iowa—I extract my beeswax practically without a press. It happened to me in this way: I had a square pan for melting honey; it was made of 10-inch plank. When I had a lot of wax to extract I used it. I put in a lot of water, several inches deep, and start it going. When the water commences to boil I dump in the waste and cappings, and as they melt I take a piece of wire window-screen and put it on top of where the wax is accumulating and commence dipping. I melted all day and dipped as the wax came to the top. Perhaps nearly all of us have seen a sorghum pan boiling. The bubbles start from the bottom and come up through. You can call it a disintegrating process. Those bubbles will come up so fast, if the fire is adjusted properly, it will boil, with those bubbles over the whole boiling surface. As fast as the wax is melted, dip it off over in this other corner where it is not boiling. I have enough so that I can boil all day and dip all the time. By this disintegrating process, the boiling will take the slumgum all out. If you think it will not, try it, please. Now, at the last, I have a square frame to fit nicely, covered with common screen, and I drop it on that and load it down so that it will sink the whole of the slumgum below the surface. If you will let it bubble a while and let the fire die out, in the morning you can take off the remaining wax. The last 2 or 3 days I did that, there was practically no wax in the slumgum; and let me tell you, it would hurt me a good deal if I thought there was some there. I believe I shipped down 300 pounds of wax the last shipment.

Mr. Hershiser—Where do you reside?

Mr. Sherburne—Iowa; a very fine country.

Mr. Hershiser—From the fact that you produce 300

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pounds of wax frequently, I would imagine you would have considerable slumgum, and I stand here ready to pay $1 per 100 pounds for it. And I will pay the freight to Buffalo.

Mr. Sherburne—If the gentleman would come after it he could have it for nothing.

Mr. Hershiser—There are a good many bee-keepers that have been in the business a long time, and they are "dead sure" they get all that wax out; and it is just like this: They don't want to sell anybody a gold brick, or even give them one, but all the same, I met one of these gentlemen in St. Louis last summer, and I almost begged of him to let me buy his slumgum. He says, "There is nothing in it; I get all the wax out, and I would feel pretty bad if I didn't. But," he said, "I will send you a barrel of it, and you can try it; all I will ask you is to tell me how much wax you get out of it;" and he extracted it similar to Mr. Sherburne. About 5 weeks after I got back to Buffalo I wrote and reminded him of the promise he had made. He wrote back and said, "I have been extracting wax the last 2 or 3 weeks, and I have about 5 barrels and I will send you one barrel." He said, "If you get 2 pounds of wax out of that 1 you will not get 4 pounds out of all the rest." In due time the barrel came, and such a mucky looking mass I never saw. All the same, out of about 85 pounds of refuse that he sent me I took out 23 pounds of pure wax. I want *your* slumgum for the same purpose.

Mr. Hatch—I will give you a word of advice. Don't let him have it. I have been something of a crank on the wax question. I have talked to every beekeeper that has come to visit me, on the wax-press, and I heartily wish to endorse everything in Mr. Hershiser's paper. I had been using a press myself for quite a number of years, but I realized I wasn't getting all of the wax out, but I can say during the time since I have been using the press I have felt very well pleased. If anyone has 100 colonies of bees I would say that in one season he can pay for a good press by the extra wax he gets; and he gets it nicer. You won't have half as much fuss as this man here, that fusses all day. I can take his wax and run it over and get, I suppose, 25 percent of it, and have it all done in half a day, and have the wax caked and ready for the market. I say, get a wax-press. If you haven't got one, get a bench-screw and make one; it won't cost you more than three or four dollars, and the wax you get is what counts.

Mr. McEvoy—I would like to endorse Mr. Hershiser and Mr. Hatch on that. Mr. Hall used to sweat and work with his old comb, and thought he didn't lose a drop of wax. Mr. Gemmill wanted to bring down his press and try it, and after melting up the slumgum, dish after dish of pure wax came out. Mr. Hall said, "I want that." I have 4 presses, and I have loaned 3, but I could get use for 53 as soon as the people got to know them.

Mr. Ferris—I have had some experience in this line. The gentleman spoke of dipping the wax. I have dipped and dipped all day, and got out every bit of wax I could find, and I had about 1½ bushels of slumgum. I constructed a wax-press mentioned in the "Review," and from that 1½ bushels or 2 bushels of slumgum I secured 33 pounds of as fine wax as you could ask to look at.

Mr. Bartz—I want to say something in regard to wax-presses that has not been mentioned. Those who have not a wax-press, and who render their wax by the hot-water process, would do well to take the comb to be rendered, on a cold day, and put it through fine wire before they put it in the water. Take a sieve made of this common wire, and sift the wax or comb through this sieve into a sack, and the pollen will stay in the sieve. Immerse this pollen in the water and weigh it down with a screen and I am pretty sure I can get more wax by the water-process than I can with the best wax-press now in use.

Mr. Hershiser—I desire to make Mr. Bartz an offer of $1.00 a hundred pounds for his slumgum, and I will pay the freight on it; and I will say that to all.

Mr. Wheeler—I have had considerable experience with a wax-press and wax-extractor. I melt my comb in the Ferris extractor, and press it with the Swiss Extractor, and that works nicely. I have always had in mind something different. If I were a mechanic, and had a factory, I would try a scheme I have in mind, and that is of using the same force in extracting wax as is used in extracting honey, and use steam for heating, and use centrifugal force for extracting. I would like to try it.

Mr. Hershiser—Adhesion and capillary attraction will beat you on that proposition.

Mr. Hintz—I have been in the habit of getting my wax with a solar-extractor. I like that very well, except where we have to get it out of old black combs; and in my experience in that case I don't believe I get very much of the wax. I think perhaps a very large percentage of it remains in the combs. Whilst I have always gotten it out in the old way in water, in a kettle or something of that kind, since there has been so much said about their being so much wax left in the combs, I have rather come to the conclusion to keep my old slumgum.

Mr. Hatch—There is one thing we are overlooking entirely, and that is the advantages of the solar wax-extractor. I think every bee-keeper, especially an extracting man, should have a solar extractor. Not but what you can get all the wax out of the cappings by a press, but they work so easily and board themselves, and cost nothing for fuel. If you have made it on the plan suggested by Mr. J. H. Martin, or "Rambler," you will find your wax all caked ready for market right in the extractor. There is another advantage: You may bring the cappings just as dry as you can get them, and then melt them up for wax, and you will get an astonishing amount of honey out of those dry cappings if you put them into the solar wax-extractor. If you run 100 colonies of bees you will get honey enough out of the cappings to pay for the expense of a solar wax-extractor in one year.

Mr. McEvoy—Three of them.

Mr. Hatch—And if you want to be real careful and watch it, you can save that honey even for table use. As soon as it is melted draw it out and it is all right. If you leave it there it is stronger. I use it for feeding the bees. You can't afford to be without, first, a solar wax-extractor, and, second, a good press, if you are in the bee-business at all.

Mr. Stewart—I am very much interested in extracting wax. I am one of those poor unfortunate fellows that has a lot of foul brood, and that has given me something over 1,100 pounds of wax in the last two years. I have a solar extractor and also a Root wax-press; and while the Root wax-press is a good thing, I know that in my slumgum I buried up more than 100 pounds of wax; and for that reason I have been very much interested in the matter, and was determined to endeavor to find some method by which I could get some of that wax out. I ship each year into the New England States my honey, and go with it and sell it, and I formed the acquaintance of Arthur C. Miller, Rhode Island, and, last year, while there I had a talk with him, and he told me he was working on the lines of a wax-extractor. He said it was something different entirely from anything there was, and something that he had great confidence in, in revolutionizing the wax-tracting business. Going down to New York City, I stopped off this year, and saw Mr. Miller, and saw his machine, and he has it perfected, and they are manufacturing them now. He had as many fifty in the process of construction, and it is so different from anything else that I will endeavor to give you the process upon which he works. The wax-extractor is round, something the same as the Root press. It has an inside can, but instead of being perforated all around, it is perforated only at the top and bottom. That is immersed entirely in water, and there is a cover put on the inside can after it is filled, so that there is no possibility of any slugum coming out. Inside of that there is a shaft running down through the machine, and on that shaft there are flanges, and also on the inside can, and that is soldered fast. He puts a conical shaped cover, and so fitted as to prevent any leakage, and that goes up to a cone. Built out from this is a hot-water tank. There is a shaft running down to the bottom, as it is boiling he turns that shaft slowly, and in that process it grinds the slumgum up as fine as possible. These flanges on the inside and outside can are arranged so that they come together, and they are made of perforated metal, and the slumgum is all ground between them, and at the same time there is a pressure there that presses them. The kettle is boiling, and the hot water which is constantly fed, causes an over-flow at the top. At the top of the over-flow there is a spout that runs down through the hot-water tank to keep it hot; and the wax as it is liberated overflows and flows out at the bottom. Mr. Miller says he can get every particle of wax out of the slumgum. If it will do what he says, it is a great thing for the bee-keepers.

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Dr. Miller—I would like to ask whether Mr. Hershiser has made an offer for Mr. Miller's slumgum.

Mr. Hershiser—I never received any offer from him, and never had any correspondence with him. Nevertheless, I would like to try some of his slumgum.

Mr. Acklin—Instead of putting the sticky cappings into the solar wax-extractor, we moisten them with as little water as possible, and strain them and drain them every night, and that seems to give a sweetened water of the right consistency for vinegar. I think the vinegar is the best that can be put on the table.

Dr. Miller—Right in that line I had cappings down in the cellar and they were what you would call pretty dry cappings. But the moisture of the cellar will be attracted to them, and if you let them stay long enough there, you will find that you will get just about every particle of honey that is there. The longer it stays the longer it keeps dripping and attracting fresh moisture to it; and you will get it for vinegar or any use you want to make of it.

Mr. Holtermann—I have not much experience of value in connection with extracting wax, but I would feel like endorsing what Mr. Hershiser has said. The question came up, of the solar wax-extractor, and as far as cappings are concerned, I consider it very valuable, but it has one defect, and that is the constant turning to the sun; and for some years I have had a thought which I believe can be made practicable, and that is, to arrange to have some simple clockword device by means of which that extractor will, upon a pivot, turn itself towards the sun during the day, and will need no looking after in that direction.

Mr. Hatch—I don't change my wax-extractor more than twice during the year. You must have a different kind of sun in Canada from what we have here! My extractor is 3 feet by 4.

Mr. Baxter—The cellar will have to be very damp to get vinegar that way. I have about 10 barrels of cappings in my cellar now. Some of it I washed last winter, and when I got within a foot of the bottom of the barrel it was a solid mass of cappings and candied honey. The only way to get it all is to wash it.

Dr. Miller—That mass of cappings will be held there and the moisture can't get to it. With a smaller quantity there is plenty of chance for the moisture to get all through it.

Pres. Dadant—We would not depend on the moisture in the cellar to moisten our cappings; we want to wash them thoroughly first.

Mr. McEvoy—I had nearly 400 pounds of honey from cappings burned as black as buckwheat. I can make use of that. I have a long capping tank, but, for all that, there is a lot of honey that melts down, and it is too dark to be good honey, so I save it up till spring and thin it with water, and between fruit-bloom and clover I feed the bees with it.

Mr. Frank—I would like to ask Mr. Hershiser a few questions. It is labor-saving that I have been seeking for as much as anything, and I thought I had found perfection in the solar extractor. Now for extracting or rendering wax from cappings, would you think, considering the labor you are saving, that your device would be profitable?

Mr. Hershiser—I used to use a solar extractor, but of late years, since I have been using the wax-press, I discontinued its use. I don't know whether that is a wise thing to do or not. It doesn't take very much trouble to get all the wax out of the cappings with your press. Of course, where you use the sun you save that much fuel. I save labor in reference to the cappings by using my press, from my standpoint.

Mr. McEvoy—You lose the honey in that case.

Mr. Hershiser—I don't know. I put my cappings out a great many times and let the bees carry away the honey. Last year I washed the cappings and got about half a barrel of nice sweetened water, and I tried to make vinegar out of it and it is in the cellar yet, and it doesn't seem much like vinegar.

Pres. Dadant—The experience of each man is different in different locations. There is a difference between the sun of Utah and Canada.

Mr. Wilcox—I have a sun extractor 3 feet by 7, and I save a vast amount of honey from it. My broken combs and wasted honey of every kind go in there, and by drawing it out before it gets too hot it is fit to market, especially that market you will find among wholesale bakers. You can sell scorched honey there at any time, because they must necessarily heat it in baking, and do. The amount of honey you save in melting up the cappings is quite an item.

SECOND DAY—EVENING SESSION.

At 7:30 p. m. the convention was called to order by Pres. Dadant.

The Secretary stated that Dr. Howard had written to him that owing to pressure of business, and so on, he was not able either to come to the convention or prepare a paper.

Pres. Dadant then called on Dr. E. F. Phillips, of Washington, D. C., to read his paper on,

EXPERIMENTAL APICULTURE

It will be well, in the beginning, to find out what the title "Experimental Apiculture" means, for it may be that the thought which first comes to the mind of most persons on hearing these two words is, after all, not what is expressed. When the Secretary of this Association wrote, asking for a talk on this subject, I had only a vague idea as to what I ought to say, but, on thinking it over, this indefinite idea was changed into one more definite, and I came to the conclusion that some ordinary views are incorrect concerning the terms of this subject.

First, let us consider what apiculture is. It is at once answered that, apiculture is bee-keeping. That is true; but all kinds of bee-keeping are not included under the term apiculture. Our fathers owned bees and every fall gave "sulphur treatment" to every skep of bees that would probably not winter. Was that apiculture?

A better definition would be that apiculture is beekeeping with improved methods, which enable man to get the results of the labor of the bees with the least expenditure of labor, and the least loss of bees. That is nearer correct, but there are one or two popular fallacies which, I think, need correction.

It is a common thing in the current bee-keeping journals and standard books on apiculture to see some special method upheld on the ground that it is "Nature's way," and one of the most common criticisms of new methods is that they are "contrary to Nature." Let us examine this form of criticism. "Nature's way" for bees to live is in hollow trees or caves; there are no movable frames, no sections, no supers to be added; queens are never introduced, honey is never extracted, the brood is never shifted, and queens are never shipped. Do we then keep bees according to "Nature's way?" Most decidedly not. Modern apiculture is, and should be, made up largely of methods and practices which are very decidedly different from those of natural environments.

But it may be answered that these things make no difference, for only such things are done as are easily overcome by the bees, and, in all the essentials, we still allow the bees to act according to their instincts. We are now approaching the true conception. It may as well be recognized at once that apiculture is the economic keeping of bees in such a way that the greatest benefit to man may be derived from them, and only such deviations are made from natural methods as can be overcome by the flexibility of the instincts of the bees. We are justified in going just as far as we possibly can from natural methods if necessary, if in so doing we do not overreach the limitations of the instinct.

Care must be exercised, then, in trying new ideas in apiculture, that we do not weaken the vitality of the bees or lessen their productiveness; but, on the other hand, by years of experience it has been shown that man has in many cases made conditions actually better for the bees by wise deviations from nature. I argue, then, that there is no justfication in this everlasting harping after "Nature's way," but we should have done with this idea, long ago discarded in most other lines of breeding, and settle down to improve on Nature, as man has done, and is doing, every day and in all fields of labor in this pushing age.

Let us, then, define apiculture as the science which takes into account the habits and adaptions of the instincts of the honey-bee so that by deviations from Nature man may increase the productiveness of these instincts for his own good.

So much for apiculture; it is now time to find out what is meant by "Experimental Apiculture."

An experiment is a "trial or special observation made to confirm or disprove something doubtful, or an act or operation undertaken in order to discover some unknown principle or effect, or to test, establish, or illustrate some sug-

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gested or known truth." There are plenty of unknown things in apiculture even if some contributors to bee-keeping journals write as if this were not so, if they would but tell all they know! Our knowledge of bees is really very limited. Little is known concerning the parthenogenetic development of drones and the determination of sex; practically nothing, of the finer structures of bees, and very little concerning the principles of breeding. There is an abundance of good and valuable work yet to be done on the purely scientific side of bee-life, but Experimental Apiculture, as I understand it, deals with a dollars-and-cents proposition, and the thing which appeals most strongly to the bee-keeper is more pounds of honey. In discussing this subject I propose to deal entirely with the practical side; and the work suggested is intended to lead to commercial results. The bee-keeper can, for the present, do without much theory, but he needs money. I firmly believe that a greater theoretical knowledge would be of benefit to bee-keepers, and more work of this kind would benefit apiculture, at least indirectly, but there is still so much of vital interest to be done along practical lines that we can confine ourselves to that in the short time allotted for this discussion. What is wanted, then, is more honey, and to this we must bend our energy. Instead of speaking about Experimental Apiculture in general, it may be better to give special instances of desirable experimental work in apiculture.

One of the first things which seems to warrant mention is the need of better methods of queen-rearing. Enormous strides have been made in this branch of the apicultural industry in late years but, after all, the methods are crude and too uncertain. During the past summer I have tried, several times, every method of queen-rearing of which I knew, in the apiary of the Bureau of Entomology, and have succeeded in rearing good queens with all of them, but there seem to be some faults in all, and every point at which there remains a chance of failure should be examined, and the method improved if possible. After these trials, I conclude that artificial queen-cells will yield more uniformly good results than natural cells, because the environment is more under the control of the operator; and that mating in nuclei is much preferable to the use of large colonies in decreasing the labor necessary; but we need improvement in our appliances and methods of manipulation. We want more uniformity of result, a decrease in the necessary manipulation, and greater assurance of success, and these, it seems to me, are the things for which to work. The most urgent present need, it seems to me, is an improved combined nursery-and-introducing cage, and a style of mating-box which will rarely require refilling during the entire season, and practically no feeding; and these two things will receive the first consideration in our apiary.

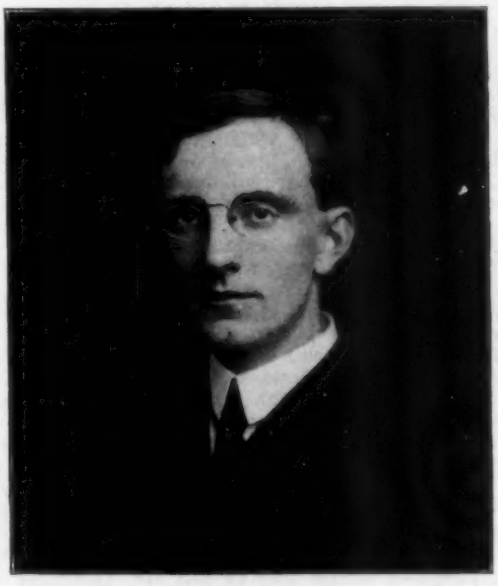
Bee-keepers should know that bees, left to themselves, will not always rear good queens, and the only safe method is to re-queen at least every 2 years, and preferably every year. This is preached enough, I know, but a small per-cent of honey-producers practice it, I fear. It need scarcely be added that, a *sure* method of introducing queens—not necessarily one said to be sure, whereby there would be no failures, or even fewer—would result in the saving of several thousand dollars a year to bee-keepers.

The improvement of forage is another thing which needs attention, but this must be dealt with by some one else, for my present work is necessarily confined to entomology, and botanical subjects do not come directly under my supervision. I feel, however, that there is much to be done here. New plants can be imported which will be of great value, no doubt, and, above all, our present forage can be improved in nectar-secretion.

There is room for improvement in hive-appliances, extractors, forage, and other things, but the one place where there is the greatest need for improvement has been generally neglected by bee-keepers; I refer to the improvement of the bees themselves. All bee-keeping is pre-eminently breeding work. The honey is the product and the ultimate object of the industry, but the working problem is strictly one of breeding. The bee-keeper can increase his output by improvment in two places: first, in the manipulation and food supply; and, second, in the bees themselves. Manipulation and food supply are being discussed continually, but we get very little real information on the improvement of bees. I do not refer now so much to the introduction of new races, but, particularly, to selection of breeding stock.

The Italian race of bees was introduced into this country about 1860, and the credit for this important introduction need not concern us at this time. The important thing now is to examine the situation to see how much this race has been affected by breeding in the hands of the bee-keepers of this country since its introduction. From about 1860 on, there has been, in some quarters, an interest in breeding this race for color and this has been done very successfully, several different breeders having taken up this line of work and succeeding, by selection, is producing 5-banded Italians. As an example of what can be done by careful selection among bees this work is of value to us. Other breeders have selected for gentleness, and, since this character is not as measurable as color, it is harder to make definite statements concerning the results obtained, but it is evident that, either intentionally or accidentally, some good has been done along this line.

But the main object in the keeping of bees is honey-production; how much has the average output per colony been increased in the past 45 years? Every bee-keeper knows that the more populous the colony during the honey-flow the more surplus honey stored, other things, such as honey-flow and weather, being equal. The problem, then, reduces itself very largely to the fecundity of the queens, and the question



DR. E. F. PHILLIPS.

may be changed so as to ask how much the prolificness of Italian queens has been increased in the past 45 years.

Another very important factor in honey-production is the eagerness with which bees go after nectar; and a third is the tongue-length, enabling them to reach the nectar in long corolla-tubes. Italians lack the eagerness which is possessed by Cyprians, but there are Italian colonies which have it to a marked degree. Several strains of long-tongued or "Red Clover" Italian bees have arisen in the past few years, but what is the history of the strains? When a queen is sold and introduced into a honey-producer's apiary, before many generations, the progeny cease to work on red clover, if they ever did; for the reason that proper selection is scarcely ever practiced, and there is not close enough in-breeding. This is certainly due to lack of proper methods in following up the breeding.

We may conclude, then, that prolificness, vigor, and tongue-length, which frequently appear in Italian bees, are not ordinarily used to proper advantage by the majority of bee-keepers. Anyone reading the reports of the early Italian importations will see that the average per colony, throughout the country, is not much better than it was 45 years ago, and in some strains there is reason to believe that it is less. Of course this is not true in certain apiaries, but I feel sure this holds for the country in general, and I am inclined

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to think that prolificness in some strains of this race is actually decreasing.

It is natural that we should want to know why this is. There is but one answer, it seems to me, and that is that queen-breeding in honey-producing apiaries, is usually not done with a knowledge of the common principles of breeding as practiced on other animals and on plants. Careful breeders of almost every other form of domestic animals know to an ounce what their stock produces, but how many bee-keepers can give this sort of a record? and it is commonly recognized by breeders that without records they work in the dark.

Breeding of both plants and animals with a view to the betterment of stock is now attracting wide attention; this work is not confined to experiment stations and wealthy individuals, but the farmers of the country are recognizing the fact that there is more money in choice stock than in scrub animals. Let me quote General Burchard, associate editor of Hoard's Dairyman, a short extract of an address to dairymen of Wisconsin, what he called "The Cow Breeder's Shorter Catechism":

"Q. How many kinds of cows are there? A. Three.

Q. What are they? A. Dairy cows, beef cows, and combination cows.

Q. What is a dairy cow? A. One that has the ability to turn all the food she may eat and digest, over and above that required for maintenance, toward the udder, there to be transformed into milk.

Q. What is a beef cow? A. One that turns her surplus food into flesh and fat.

Q. What is a combination cow? A. One that tries to take both forks of the road and never gets anywhere.

Q. What causes the difference in cows? A. Heredity.

Q. What is heredity? A. The biological law by which living beings tend to repeat themselves in their descendents."

Cattlemen realize that they must breed for one thing in cows, and I believe that bee-keepers should settle down to one line of selection. Honey-production, gentleness and color, do not necessarily go together, and the chances of finding all these combined in one colony are small. Which should be chosen? Honey is the object of most bee-keeping, and that then should be the one, and the colony line of selection for the honey-producer. You may arrive at this by selecting prolificness, or tongue-length, but not both without great difficulty, and, therefore, prolificness, which is vitally necessary, should be the first consideration.

In the extensive work of the Maine Experiment Station on egg-laying in hens it has been found that some of the best formed hens were poorest in laying ability, and *vice versa*. They, therefore, select for number of eggs and let everything else go. In this series of experiments they begin with a flock with an average of 120 eggs per year, and now have many individual hens which produce from 200 to 250. This, too, has been done in a very few years.

The application of statements concerning stock may be transferred to bees, and, therefore, does it not seem time for the bee-keepers to arise and join the procession? Let the honey-producer drop all fads of color, gentleness, and similar things, and breed pure stock for honey, and no longer aim at an "all-purpose" bee.

Allow me to mention here an institution worthy of notice. There was started, about two years ago, an organization know as the American Breeders' Association, and breeders of both plants and animals are uniting in the study of the principles of breeding with a view to improvement of their stock. Breeders of all kinds of plants and animals have seen that they have interests in common, and there is absolutely no ground for a belief that the same principles of breeding do not apply to bees, and I believe no one claims it, yet none of our queen-rearers have seemingly cared enough about the information to be derived to pay the one dollar membership fee which entitles the member to a volume of proceedings worth $5.00 to any breeder. According to the directory in the first volume, the total number of members interested in bee-breeding is one, and that one is not included in the last published list of members of the National Bee-Keepers' Association. I am happy to say that since then one other person interested to some extent in bees has joined, and he is also a member of the National. I would urge that the National Bee-Keepers' Association join the Breeders' Association, and then let every member who cares anything at all about the improvement of his bees do likewise. The fee is small and the benefit large. This scarcity of bee-keepers may be due to the fact that the organization has not been properly mentioned in bee-journals. I trust that the editors of the journals will look into this Association, and then give it a little free advertising, for it is a worthy object and is in no sense a commercial enterprise. The editors can do great good in a matter of this sort because they have an easy means of access to the men who should be interested.

Since much scientific work has yet to be started in queen-breeding, it may not be a miss to enumerate some of the approved principles of breeding and apply them to bees. You will notice that I say queen-*breeding*, not queen-*rearing*, for there is a vast difference.

The two great factors of all life, both plant and animal, which make improvement possible are *Variation* and *Heredity*.

It is proverbial that no two individuals of any one species or race of animal or plant are exactly alike, and this of course applies to bees. During the past winter, I examined 500 workers and 1,000 drones, making in all between 5,000 and 6,000 measurements, and the results showed remarkable variability in this species. Drones vary considerably more than workers in color and size, and, although I did not have large numbers of queens to measure, it is well known how variable they are. These measurements were of structures, but equal variability is present in the ability to do work, either of egg-laying or honey-producing, as witnessed by the inequality in stores and population of different colonies. There is, then, enough variation.

The other great fact in nature which makes it possible for man or nature to improve a species or race is, at first thought, directly opposed to the foregoing. "Like begets like" is also true. A prolific female produces daughters that are also prolific, though not all to the same degree; but it is an established principle of breeding that excessive prolificness in a female tends to produce in her offspring prolificness at least above the average for the race. If variability existed without this hereditary tendency, no improvement could be made, for at every generation the individuals would again vary in all directions. On the other hand, heredity could do nothing for us in our work of selection were it not for the fact that variations occur, but around a new center, as it were, in each generation during selection.

The weeding out of undesirable stock is the greatest task of the queen-breeder. He must pursue his work by (1), inducing variation; (2), producing large numbers of individuals; (3), weeding out all undesirable blood by breeding from but one, or very few select animals; and (4), fixing the type. In queen-breeding this means that hundreds of queens must be bred and tested every year, and a very few chosen to continue the work during the following season: it does not seem best to use as small numbers as do most queen-breeders. The Funks in their work on corn-breeding tested 5,000 ears, which bore no relation to each other, and chose *two* as breeding stock. Luther Burbank, the wizard of horticulture, advocates even larger numbers, having chosen 1 in 10,000 from among some of his plants. In queen-breeding we are more restricted by the limitations of any locality, but I think I am right when I say that a breeding queen should be the best in at least 500 tested queens, and the test is to be made by the actual amount of honey produced in a year as compared with the other 499, always assuming, of course, purity of stock. Cattlemen use scales and the Babcock test as the only safe method of choosing the dairy cow; let us use scales in our judgment, and disregard color and other fads when rearing honey-producers.

For "fancy" bee-keeping, as practiced by many amateurs, color or anything else that attracts may be used.

Since mating cannot be controlled in bees as in mammals, it will be necessary to have several colonies producing drones, but every colony chosen for this purpose should have a high honey record of at least one year's standing, and the queen should be quite as good as the breeding queen. The majority of bee-keepers are notoriously lax in this regard. In many cases the drones of every colony in the yard are allowed to fly, and just so long as this is done we will have no advancement, for this one-sided selection is working against odds that the bee-keeper cannot overcome. In defense of such loose methods some queen-breeders argue that a very large number of drones are necessary and that they can be procured in no other way. During the past summer in 16 colonies in the Arlington yard, of the Bureau of Ento-

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mology, I produced enough Caucasian drones to stock a queen-breeding yard with an output of 2,000 queens a year, and this could have been done with half that number to advantage. I may also add that pure matings were secured in the very large majority of cases, although that apiary is far from being isolated; mention this to show that more drones are unnecessary.

We have pedigreed horses and cows, and even pedigreed corn and wheat; why not pedigreed bees? I think I am not asking too much. I hope the day will come when the breeders will advertise as follows:

"I am this year using my celebrated breeding queen Smith 168, which is the mother of a colony which last year produced 50 per cent more honey than my average colony. This queen is the descendent of 6 purely mated queens, all of which were mothers of colonies producing over 300 pounds of honey a year. For drones I am using 5 queens, all of which are mothers of colonies which last year produced over 300 pounds each."

This is not visionary by any means, for it is exactly what breeders of other stock are doing; and it is pleasant to note that some wide-awake queen-breeders are doing almost that now.

There is the recorded case of a colony producing 1,000 pounds of honey in one year; of course this was in a good season, and under careful manipulation, but think what a valuable queen was lost when that queen was not made the mother of a long line of breeders to be distributed all over the United States. Few honey-producers are so situated that each colony can produce any such amount of honey, but it is necessary to aim high.

There are two points which require additional consideration. The first is the desirability of breeding the race pure. Crosses or hybrids are so variable that they should be avoided except when necessary. Let me quote from Dr. W. E. Castle, of Harvard University, on this point:

"Since cross-breeding is likely to modify characters even when these conform to the laws of alternative inheritance, and is certain to modify them when they give blended inheritance, it should be practiced with extreme caution, and only by the breeder who has a definite end in view, and a fairly clear idea of how he is going to attain it.

"The purity of standard breeds should be carefully guarded, and much attention should be given pedigrees, for even when individual excellence is not apparent, it may be present in recessive or else in a latent state, which suitable matings will bring into full realization, provided the ancestors were superior animals.

"At the same time the breeder should be on the lookout for individual peculiarities of merit. And he should not be discouraged if these are not transmitted to the immediate offspring. A simple character which disappears from the children, but reappears among the grandchildren, can at once be made a racial character, for it is recessive in heredity."

The breeder who uses a mixture of races for breeding is doing something which is very likely to cause him trouble. There is very little necessity under present conditions for this, since a good race may be chosen as a foundation stock which can be surpassed by crossing, only with difficulty, and careful and systematic selection within the race will bring almost as good results with the great advantage of more stability—a point of vital consideration. Let me make this point a little more clear. There is reason to believe that, where some queen-breeder takes up the improvement of bees by crossing, he will outstrip all the rest. He will induce greater variability, and will, consequently, have a greater range of material for selection; he will be enabled to combine the desirable traits of two or more races, and, at the same time, if proper care is used, eliminate the undesirable traits. This can be done purposely only by a person who has a most thorough understanding of heredity and variation and no one else should undertake it, for there is otherwise too great a danger of bringing out all the undesirable traits and losing the good ones. This, then, is why pure races are generally so essential; when the proper men take hold of crosses they will get great results, but the majority of breeders should not risk the handling of fire in that way, and, as for the rank and file of bee-keepers, it is, I think, absolute folly. A bee-keeper may say that he cares nothing for races; that all he wants is honey. All this is very true, but he cannot afford to overlook the fact that nature has laws which he, with all his independence, dares not disregard. I consider the bee-keeper who fills his apiary with what we may call scrub hybrid stock as a poor bee-keeper.

The second point is the common prejudice against inbreeding. I can do no better on this point than to quote from Mr. N. W. Gentry, who is well known as an extensive breeder in Berkshire hogs. Mr. Gentry has for years practiced inbreeding, and before the Champaign meeting of the American Breeders' Association, in February, 1905, he said:

"From father to son for generations has been handed down the common belief that inbreeding of animals produces offspring of less vigor, less vitality, less constitution in proportion to the extent to which it is carried on continuously, and this belief seems to have been accepted as true without any proving by the very great majority. My experience has led me to believe otherwise, or rather that such results need not necessarily be true.

"Neither inbreeding nor the reverse will be a success unless matings are made with animals suited to each other, that is, having no weakness in common, if possible, and as much good in common as possible. This, in my opinion, is the key to success in all breeding operations and success will come in no other way. In my opinion inbreeding as a rule is very good or very bad."

"I have watched results of inbreeding in my herd for years, and until I can discover some evil effects from it—and I have not yet—I shall continue to practice it."

Mr. Gentry has one exceptional boar known as Longfellow 16,835; he says concerning the stock:

"In my breeding operations I reasoned that if the Longfellow blood was the best to be found (and I have no reason to change my mind yet), and, if I used a boar not related at all, as most would advise, I would lose at first cross half this good blood, and upon another like cross a quarter more, leaving them only one-fourth the Longfellow blood. This I reasoned would be losing a good thing too rapidly. I think I have continued to improve my herd, being now able to produce a larger percentage of really superior animals than at any time in the past."

In breeding it is generally believed that inbreeding is detrimental or fatal, but, fortunately, breeders are now seeing that the idea is usually without foundation. Of course, inbreeding accentuates common weaknesses but we should use it in accentuating strength, as it will when properly directed. Think what it would have meant to bee-keeping if the blood of the Cyprian queen whose bees produced 1,000 pounds of honey had been preserved by inbreeding; and what it will mean if some of the present good queens are kept by this method. I do not advocate universal inbreeding, for it is well known that inbreeding is, generally speaking, not natural, but, even in nature, it is frequent, and it is by no means universally true that it is detrimental. Therefore, if there is reason to think that it is best, it should be fearlessly practiced. How this prejudice against inbreeding arose, I do not know, but we all know how general it is. Nevertheless, it is true, that the breeders of stock who now practice it are the ones who are getting results of lasting value. On one or two points, I do not wish to be misunderstood. I do not wish to condemn the breeding for color or for long tongues. I really consider color selection a fad, but there are those who prefer the lighter colored bees, and as long as there is a market it will pay to select them. Long tongues would be an advantage doubtless but in whatever way we are breeding let us not forget that increased honey-production is the essential. If these bees have longer tongues, all right and well, but the selection should be made by the scales.

Now you may ask whether in the work of the Bureau of Entomology this problem is to be taken up. I can make no promises for the future, for I am not in a position to outline future policy, but whoever takes up scientific breeding of bees will do a good work, and results seem certain enough. It is not my purpose to confine myself to promises for I do not like to make promises for fear that I may not be able to fulfill them, but I hope this may be done by some one. It may not be out of place to say here that the idea of having any outside aid for this work which it was suggested that I do, was entirely that of Professor Cook and had neither my sanction nor approval, either before or after publication. I desire no such assistance.

But to leave general experimental apiculture, it may not be amiss if I speak of the work of the Bureau of Ento-

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mology since I am a representative of that branch of the Department of Agriculture.

During the past few months some work, which may be of interest to the members of the National Bee-Keepers' Association, has been done and I will briefly outline it. Most of this is to be considered merely as tentative, since the investigations are not yet completed, but some idea may be got out of what has been done recently. I will report only on the past and leave the future till a later date.

The best methods of queen-rearing have occupied most of the time during the summer. I have tried several times every method of which I could learn and have tried to test them impartially. I am convinced after these trials that by the use of artificial cell-cups we can get more uniformly good queens than by any other means. For mating nuclei I prefer a comb area about equal to one standard Langstroth frame, divided into 3 frames with about 500 to 800 bees. The style of box is relatively unimportant. I have prepared a short bulletin on this subject which is ready for distribution, and I will take pleasure in sending it to any one who requests it. I can say that the illustrations are fine, since I did not take the photographs myself, and they alone show most of the methods more clearly than is possible in a description. This will be sent to all persons on our mailing list, and any person interested in bees may be included in this list.

A considerable number of queens of the Caucasian variety have been distributed during the summer. These bees certainly surpass any other race, known at present, in gentleness. As to honey-production, not so much is known but I have received some excellent reports. I think there is a great future for these bees, and good queen-breeders are taking hold of them. If selected for honey-production, according to the ideas which I gave a while back, I believe they would be the most popular bee we have for city bee-keepers, at least. There seems to be an idea among some of the bee-keepers that the Bureau of Entomology claims that these bees are the best bees known to apiculture. These bees have been recommended for gentleness, and no exaggerated statements have been made either by Mr. Benton or myself, as far as I am aware.

Let me quote from Mr. Benton's Farmers' Bulletin No. 59:

"Caucasians are natives of that portion of Russia lying between the Black and Caspian Seas; are exceedingly gentle, good workers, good defenders of their hives, prolific, build many queen-cells, and swarm often if confined to small hives. They are dark gray in their general color, although the workers show frequently one or two yellow or leather-colored bands; are somewhat smaller-bodied than Italians or Carniolans, have good wing-expanse, and hence are nimble flyers. The drones are rather small and quite dark in color, queens not large, and varying in color from a coppery yellow to a dark bronze."

At the St. Louis convention these bees were discussed from the published statements. I cannot see that too much was claimed for them. It is too early to prophesy as to the ultimate future of the race, and above all they should not be condemned without cause as has been done. Of one thing I think I can be sure—unless care is used in selecting breeding queens of this race we shall hear the bees condemned when it will be the fault of the breeder. This is why I am anxious to see these in good hands until they are tried out.

There has been some misunderstanding as to the method of distribution of queens by the Bureau. The Bureau of Entomology should not, I think, give away any queens which can be purchased in the United States, and thus interfere with the business of the domestic breeders. The regulations concerning this distribution have not been well outlined, and, after consultation with others who have conducted government distributions, I, therefore, drew up the following plan which has been approved by the chief of the Bureau and by the Honorable Secretary of Agriculture:

"To any experienced queen-breeder who will guarantee to rear queens and mate them purely in considerable numbers for general sale, the Bureau will send, as far as the supply will allow, one high-grade breeding queen, purely mated and carefully tested. In addition, several queens whose matings are not known will be sent for drone-production, since drones are not affected by the mating; all queens, however, will be from good stock, the number to depend on the supply at hand. The breeder making the request must give evidence of his ability to rear good queens, must agree to offer at least 200 pure-bred queens a year for sale to the general public, and must not ask for them an exorbitant price. It is the opinion of the Department that 20 percent more than the current price for Italian queens would be fair. It will also be expected that in future years the breeders will do their utmost toward the improvement in honey-production, at the same time maintaining the purity of the races. The Bureau will be glad to aid breeders of this class to its utmost ability, but will not aid in any way a breeder who offers for sale or sells crossed hybrids of the various races, except in the case of untested queens, and even in that case, every possible effort should be made to get pure matings.

"After this distribution all inquiries to the Bureau will be answered by giving a list of reliable breeders, including those who have received stock from the government apiary; and the name of any breeder who knowingly sends out inferior stock will be dropped. It is not the purpose to interfere with the private business of the persons receiving queens, but these precautions are taken to protect the bee-keepers of the country.

"No applications for queens under other circumstances will be considered. All applictaions will be considered in the order of their receipt."

I trust that this method will seem fair and just to all, for it is my desire to give everybody a "square deal," and I do not care to distribute queens merely to give something away. I also hope that by this method we may be able to induce a good many first-class men to take hold of this work. I will do everything I can to aid the right men, but careless breeders, and those who give second-grade queens to their customers, need not apply. If I could give you a list of the persons who have written for Caucasian queens this summer, I am afraid you would all go into the business. The present demand is due to notices in ordinary newspapers which were caused by the extreme gentleness of these bees. This is not the kind of fame which I desire for bees being distributed.

Caucasians, Carniolans, and Cyprians are now being included in this distribution, as will be any other races which may be obtained in the future. The Banat, or Hungarian, bees which are also very gentle, are being tested and may be worthy of distribution, but that remains to be seen. If they are, they will be included.

During the summer I found some lesser wax-moths, *Achroiagrisella,* and began to breed them in a wire-cloth cage. They behave in much the same way as the other large wax-moth, *Galleria mellonella,* but I think they are more inclined to burrow in the brood-chamber. I asked for information concerning the distribution of this species, through the American Bee Journal and Gleanings in Bee Culture, and received reports of them from various parts of the country. They are doubtless found elsewhere for they have been introduced into this country several times, and seemingly have later disappeared.

Bee-diseases have received some attention also. Owing to the fact that I have entered the service of the Bureau late, I was not able to get started on this work very early in the summer, and consequently have been handicapped, but the work is of vital interest and worth continuance. Through the kindness of several men prominent in apiculture, I received a large number of samples of diseased brood. The Bureau of Animal Industry, at my suggestion, assigned a competent bacteriologist to this investigation, and between us we have been getting a fair start. So far the results are briefly, that *Bacillus alvei* has been found in every sample of "black brood" and not a single case of foul brood, confirming the work of Doctors Veranus A. Moore and G. Franklin White, of Cornell. No characteristic germ of foul brood has been found. In one sample, from foul brood, which was unmistakably contagious, sent in by my assistant, Mr. John M. Rankin, who is in California, we found a bacillus resembling *Bacillus alvei* in many respects, but on cultivation, it was found not to be the same. When fed to a colony it did not produce the disease, although the feeding continued for over a month. The final outcome of this investigation is still unknown, and I present these few facts merely

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that you may know what is being done. There is much confusion on the subject of the germ brood-diseases in this country, and I hope it can be straightened out. Evidently bee-keepers confuse these names, or possibly the foul brood of Europe and Canada may not be the same as our foul brood. Please remember that I do not make this as a definite statement: I merely say that we cannot find *Bacillus alvei* in so-called foul brood. The germ *Bacillus alvei* itself is well known, and its characters have been well studied, and what now remains is definite knowledge of its distribution and exact information of a working nature so that the bee-keeper will know just what he can do with the disease. This is the work which must be done. It is very desirable that a large number of samples of brood-diseases be examined from all over the country, and I hope that any members of the National Bee-Keepers' Association who have any such trouble will be kind enough to send me samples. For the present I could do nothing more but report on the presence or absence of *Bacillus alvei*, but I shall be glad to do that as soon as the examination is made. We cannot receive too many samples, and I shall ask your co-operation during the next season.

The so-called "bee-paralysis" has come in for its share of investigation, but I regret to say that I cannot as yet even suggest a cause. No pathogenic bacterium has been found in bees which died of paralysis, and I do not think that there is evidence that *Bacillus gaytoni* has anything to do with it. The theory that certain plants were poisoning the bees and causing the symptom of paralysis, was also investigated, but I failed to produce the disease when bees were fed on honey mixed with the characteristic alkaloids of these plants. In the meantime I have gone over every word of the literature on paralysis that I could find, and while it is hard to judge from descriptions, which are generally not clear, I am inclined to the belief that several different troubles are combined under the word "paralysis." I sincerely hope that some one can tell us something about this disease before another summer passes, and I would respectfully request that any of the members of the National Bee-Keepers' Association having the disease in their apiaries next summer would notify me and make careful observations. I shall visit some regions where the disease is at its worst, if possible.

A series of experiments on feeding has been begun in which sugar solutions of different strengths are used for the purpose of determining to what extent the cane-sugar or sucrose is inverted by the bees into reducing sugars, such as for the most part are the ingredients of honey. So far I have been able to get results from only one experiment in which sugar was fed in a 50 percent solution. In this case the water was evaporated until 80 percent of the solution stored was solids, and 15 percent of the total volume was unmodified sucrose—an amount which would at once show a chemist that he was dealing with an adulteration. The remainder of the sugar was the same as that found in honey. These experiments are now being continued indoors, and it is too early to tell what will be the result. If the results are exact enough in the sugar analysis it should be possible to answer that much-guessed-at question of how much honey is required in the secretion of one pound of wax, since in some cases the bees are allowed to build combs.

During the past winter, while Mr. Benton was in the office, packages of seeds of honey-producing plants were sent out to about 500 bee-keepers, but only a few of the reports are in yet, and I can give you no general statement of the result. Some glowing reports have been received of Sainfoin and Serradella as valuable plants, and they seem worthy of investigation on the part of every farmer bee-keeper.

Last June there was established, on the recommendation of Mr. Benton, a sub-station for apicultural work at Chico, Calif., with Mr. J. M. Rankin, Special Agent, in charge, for the purpose of studying special conditions in that State. Mr. Rankin spent some time, during the summer, working on paralysis, but found it more rare this summer than it has been for 16 years, and consequently any definite results were impossible. At this station certain features of our work at Washington are to be repeated as a check. The main difficulty in this station, is the distance from Washington, which makes it difficult for us to keep in close touch.

In his address last year before this Association, Mr. Benton spoke of the establishment of an experimental apiary at Arlington. This plan was somewhat modified, so that the main apiary of the Bureau is in Washington, with an out-yard at Arlington for the mating of queens to Caucasian drones. In addition to this, permission has recently been granted for the placing of colonies of bees on another farm of the Department of Agriculture, 6 miles north of Washington, for the study of diseases, such as foul brood, black brood, and paralysis, where there is absolutely no danger of contaminating our own bees or those of any other bee-keeper. In this way fresh samples are obtainable, for it is often hard to examine combs after they have been in the mails several days.

As you know, Mr. Frank Benton, Apicultural Investigator, left early in June on an extended trip after new races of bees, under the direction of the Bureau of Entomology. Mr. Benton visited various European countries, and we, from time to time, received queens from him. The uprising in the Caucasus delayed him somewhat, but he finally reached that country and got several queens which, for the most part, reached Washington alive. He expects also to visit India and the Philippines to study the giant bees of the genus *Megapis* before returning, and will send some of them to the United States, if possible. It is certainly to be hoped that he will be able to settle once for all the question, which has been so long debated without many facts one way or the other, as to the desirability of introducing these bees.

Last spring Mr. Benton conducted a rather heavy correspondence with the different manufacturers of cake chocolate, with the idea of inducing them to use honey in place of cane-sugar. Various ones promised to try it, but nothing was done. On Mr. Benton's departure, this was turned over to me, and I visited the Stephen F. Whitman Co., of Philadelphia, when in that city on other business. They took up the matter and report that they have tried in every way to do this but that it is impossible. They, of course, recognize the desirability of using honey, but claim that their machinery is not adapted to such use. It was hoped that this would open a market for a large quantity of honey, but the effort was without success.

During the summer a good deal of routine work was necessary. The mailing list of the office was badly in need of revision, and that took considerable time, and, in addition, as far as was possible, a complete list of queen-rearers, bee-disease inspectors, bee-keepers' societies, and supply dealers was made. These things are necessary in order that we may know just the condition of affairs in the bee-keeping world, and are of great value in the work. At present, back volumes of the American bee-keeping journals are being carefully indexed, which will save much time in looking up any subject. Of course, such work has to be done when there is a lull in our rather heavy correspondence.

In conclusion, I wish to express my personal appreciation of the help which I have received from bee-keepers in various parts of the country since I have been connected with the Bureau of Entomology. Without such kindness it would be difficult to accomplish anything, and I can only assure you that I shall do my utmost to advance the interests of the industry with your help. I shall appreciate any criticism which may be made of my work, as long as it is based on facts, and shall endeavor to profit thereby; but I ask for neither praise nor blame from anyone who does not know what he is talking about. Let me especially ask for your co-operation in the bee-disease investigation during the coming summer.

E. F. PHILLIPS.

Dr. Miller—I believe that if anything is done to amount to very much in the way of improvement, such as Dr. Phillips has been talking about, it will not be so much by some one special person, as it will be by the rank and file taking hold of the matter. So many seem to get the idea that it will be a queen-breeder. I would like to call special attention to this distinction between queen-breeders and queen-rearers. I would like to ask the question, What percentage of queen-breeders are there among queen-rearers? I don't want to press that question, but I believe all of us to a certain extent can become queen-breeders; and when the rank and file do that, then we will begin to have advancement and improvement in our stock. I do feel like heartily thanking Dr. Phillips, and I wish all who feel with me like thanking him to signify it by a rising vote of thanks.

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[The members of the Convention arose, and the suggestion was greeted with applause.]

Mr. McEvoy—I never heard a paper in my life that I liked so well as that one.

Mr. Moore—Dr. Phillips, in his very excellent article, has touched on a point that I think we are all intensely interested in, and we have with us one who has perhaps the best experience of any person in this country, and I would suggest he now address the convention on his personal experience in connection with foul brood. I refer to Mr. Wm. McEvoy, of Canada. [Applause.]

Mr. McEvoy—I could not help but take keen notice of what the Doctor was saying about these different kinds of brood—black brood and foul brood—and I can not help but think that there were many mistakes made in some of the kinds that were sent; that they were mistaken for something else. It has been thirty years since I first handled foul brood. In 1875 it broke out in my own yard, and I worked out the cure I have given to the world on that.

Speaking of the kind of dead brood, I meet it every year. Last year all over Ontario and in many parts of the United States there were immense quantities of dead brood mistaken for foul brood, and by many that had had it before, and felt sure they knew what they were talking about. It was simply starved brood. After the apple-bloom failed, for a long period before they touched clover, in many places they started brood, and they ran out of unsealed stores, and when they are caught like that they will not uncap the old honey fast enough to keep pace with the amount of larvæ; the result is death. Part of the brood is well fed, some of it is starved and some does not get enough just before it is capped. Some of them will die under the cappings and some hatch out, and you cut the cappings and it will be recapped. The bees are poorly fed. Every year I have been called out in connection with these cases, and I found no foul brood. For every 4 or 5 cells of foul brood you will find 19 or 20 starved in the comb, and this is what causes mistakes and confusion. They say, "Oh, I have had it before and the bees cleaned it out." But sometimes it *is* foul brood, and it will clean the yard out, and it is just as well to be careful of what they get hold of. The bee-yard is no place for a burying ground or a graveyard. But I would advise that you sacrifice your bees by treating the whole yard as dead brood. Let us go to work and feed them, and give them a double shake.

There have been men in Ontario and the United States who have treated it for foul brood when it was starved brood, and it was feeding that it wanted. This treatment only aggravated it, and it still did not get enough. If the bee-keepers will feed they will not have this ordinary dead brood. Some queens are good feeders under poor circumstances, and others, again, are poor feeders under good circumstances. I have never heard a paper I liked better than that, especially where he spoke of breeding, and I do think 90 percent of all the queens on the continent of America want killing. I like the bees that under trying circumstances will feed the larvæ well; and in feeding that larvæ in these periods we will have bees that will double the honey crop. It will pay to feed during these periods. But come to the disease, that is what so often causes the confusion; it is this finding of so much dead brood. There is lots of it this summer. It took a dark color and almost a blue nature, and it would stretch almost a quarter of an inch; but hadn't the stench, although it had a pretty heavy odor. I notice that, all over, the bee-papers speak of so much chilled brood. That was a little out of place. It was *starved*. The flow shut off, and the bees didn't uncap the old honey fast enough. Feed during these periods, and it means a good deal. Feed, and watch the results, and you will see how fat, and plump, and white the larvæ are. That which is half starved, you will see little hollows that you can put the head of a pin in.

I have not in 20 years opened a hive of bees, but what I have taken a close look; and some places they have said, How do you find the queen? How do you like the color of the bees? I didn't look at the bees. I could see how they were feeding the larvæ. Come to find out, they had gotten the queen from certain parties in the United States; and I would say, kill every one you have got and breed from this good one. The Doctor is right.

The treatment I give is the only practical one. Drugs are of no use. Don't be deceived with drugs. You can't cure any apiary if it is bad. You may use gas, and so on, but where they fill the comb and fill in on the hard crust old foul brood and cap it over, you can't kill that and make a success. The only way to do is to take away the combs and follow the bees for the honey they take from the combs, and let them build combs for days in bad cases. Now put the honey and case in the bee-yard, and give it one shake and it will generally cure it; but there are also several that would fail, because the next thing they do when they get weak is to fill in the center. The honey to become diseased in a bee-hive must first of all be stored in a diseased cell. Nearly all the honey in the top of the comb is sound. Why? It is clean honey from the fields in queen-cells. But where it is stored close to the ring, in on the old crust, that is where the disease is.

Mr. Lyons—Do you consider pickled brood has the germ of the disease?

Mr. McEvoy—I never like to say anything about any one else's treatment. If you do the feeding at the proper time you will never have pickled brood. You feed now at the close of the honey-flow and help your bees up the hill. The spring of 1889 was one of the most favorable springs in Ontario. Things went booming along. On May 28 came frost, which was followed by 3 or 4 days of rain. I said to all the bee-keepers, the brood-chambers will be a mass of dead matter. The bees are caught out, the brood-chambers are full, and they are going to use up the unsealed honey; they won't uncap the old stores fast enough, and great starvation will take place. All over Ontario they were spreading, and they had foul brood, and dead brood, and everything, and run short of the honey crop. The last two weeks in May and the first week in June, in 1894, we had three weeks of rain, rain, rain all over Ontario. During that time the bees run short of bringing in stores to keep pace with them, and that year there was a lot of dead brood all over Ontario the same way. Then last spring was a bad one, and the spring before. There is not enough attention paid to help the bees during that gap.

Mr. Lyons—That has been exactly my experience this spring. I had 50 or so of those Alexander feeders and I put them right on after fruit-bloom and it worked very well.

Mr. McEvoy—Pickled brood will turn on its back and turn up. You will notice some of the cells thin capped. The bees as much as uncap and say, What is the matter with you? You will find in some cells that a cap is not cut. The bees have not enough strength to move the jaw. Feed will save all that.

Mr. Rice—Wouldn't uncapping honey answer the same purpose?

Mr. McEvoy—Yes, you are right. That is business, and I do that, too; and I would rather do it while there is honey. Give 2 or 3 frames; do not bruise or scratch it; shave that off neatly and then it will not run. Skip the next night and then give 2 or 3 more frames. Take a jar and turn it upside down and put it on the center of that, and you set that food down where the bees most need it, and feed continuously. In 1894 I tested it. I was feeding, and the food kept going, going, going, but there was a little drawback about it, that got onto the honey-flow and at last my out-yard nearly went to pieces. But the bees were vigorous. You will get these bees from a fed colony that will come right down in showers. There is a vim, and a snap of life in the bees that are fed, compared to what there is in the others. It is best to feed in this bare period.

Mr. Moore—I wish Mr. McEvoy would help us clear up this question as to the difference between foul brood and black brood, and what bearing it has to a layman; and as to *bacillus alvei* being found in foul brood or black brood?

Mr. McEvoy—I am not able to tell that, when it comes to black brood; I have seen it, and handled it, and treated it the same as the other. When you speak of a specific germ, you are going beyond me. You will have to take the scientist for that. But in either case this treatment has got to come in. No drugs will be of any use with foul brood.

Mr. Hatch—I understood Mr. McEvoy to say that there would be no such thing as pickled brood if we feed between fruit-bloom and clover bloom.

Mr. McEvoy—You will never have pickled brood under those conditions.

Mr. Hatch—I found it in California. I had 250 colonies

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in one location and I had, half a dozen times, at least, right through the honey season, pickled brood. I had the same thing in 3 apiaries in Wisconsin.

Mr. McEvoy—And running on till the end of the honey season? You will find some of it in combs near the end of the honey season.

Mr. Hatch—How is feeding going to help it?

Mr. McEvoy—Don't let it start. It didn't start them. The bees from some queens are poor feeders of larvæ.

Pres. Dadant—If it continues during the honey season it is contagious.

Mr. McEvoy—No.

Pres. Dadant—My experience is different.

Mr. McEvoy—It will hang on and continue. This year it did continue pretty nearly to the end of the honey season, but I would change the queens in that case when they won't feed their larvæ.

Mr. Hatch—I have changed the queen in one and it had no effect whatever; the disease kept right on the same.

Mr. McEvoy—I never had a case, or saw a case.

Mr. Hatch—This year I saw only one colony that was the least affected, and that only in two cells.

Dr. Phillips.—What difference does it make whether there is a germ or not? was asked. I think it makes all the difference in the world, if we have something in the hive that is going to carry contagion if it is spread; if it is due to some other cause it will not spread in the same way, and the bee-keeper will have to know whether there is a germ there or not, so that he will know how to avoid it.

Mr. Baxter—I have had no foul brood in my apiary, or disease of any kind, until this year I had a case I thought was foul brood. I got scared about it, and I asked my brother-in-law to come and look at it, but meanwhile I changed queens, and the trouble stopped at once.

Mr. Evoy—It generally will in that case.

Mr. Moore—This seems to be a heresy. Dr. Howard, of Texas, has taught us that *bacillus alvei* was found in foul brood. I have studied all of them, and all the authorities have told us the same thing; but Dr. Phillips comes along and says there is no *bacillus alvei* found in foul brood. I thought an answer to the question would help us to get clear on this point.

Dr. Phillips—*Bacillus alvei* was first described about 1885 by Cheshire. They described it from specimens obtained in England. The second description was that by Prof. Harrison, of Canada. He described it as present in foul brood. Then Dr. Howard, of Texas, described it as foul brood. After that Doctors Moran and White of Cornell got up and found in black brood the same germ. I think, personally, what Cheshire described was what Mr. Moore refers to, and from the other conditions I should judge it was another disease. Let me say here that in every case in which I took a sample of brood I got it from a man who had had years of experience in treating the diseases. I got it from men who know these diseases from practical experience all over the United States.

Mr. Holekamp—Mr. Phillips, when we send you samples of foul brood, do you keep a record of them?

Dr. Phillips—Yes.

Mr. Holekamp—I sent 5 samples last year to Mr. Benton.

Dr. Phillips—I can't say about Mr. Benton's records. I have kept my own. I suppose it can be looked up.

Mr. Holtermann—There is one point in connection with the paper that I think should be brought up, and that is that quite a number of us are very much exercised about the distribution of Caucasian bees. I think it would be wiser if these Caucasian bees would not be spread about at the present time. I may say I am personally very much pleased, indeed, that the Department of Agriculture at Washington is taking this matter in hand, of helping the bee-keepers, and I think it should receive the warm co-operation and assistance of the bee-keepers, not only in the United States but in other countries. I am pleased, also, that they are seeking to find if possible new races and varieties of bees, and improve the race; but for my part I think it would be better if these bees were not distributed as it is proposed they should be, because, as we know, we can not control where they shall go. If we find they are as objectionable as some say, it would be a very serious matter to have them scattered abroad. One man in our own country had 22 queens, and he says at the present date he finds strains of these characteristics cropping up which are confined to the Caucasian bees and he has tried to stamp them out during the entire 23 years. Wouldn't it be better to test them somewhere where they would not spread, instead of scattering them through the country where we may not be able to control them and it may prove serious for us?

Mr. Abbott—I agree somewhat with Mr. Holtermann, but not for the reasons he gives. I don't think the Government should distribute *anything*, but I think the most disgraceful thing the Government does is distributing seed, and I would object to the queens being distributed on the same ground. But it is entirely too late for us to tell the Government what to do. We have a very excellent Secretary of Agriculture, who is wide awake and progressive. And we have a very excellent entomologist, and they have marked out these lines and now the best thing we can do is just keep our mouths shut and let them do what they want to, in my opinion.

I want to say, while Dr. Miller was commenting on this excellent paper he said one thing that I don't believe is so—he said that this would not be confined to one individual, we could all have it. We can't do it. It has never been known that all people have it. How many Burbanks do you think there are in the United States? There is only one. And there are only two or three men that have made any progress in the matter of the Corn Investigation; and there are two or three breeders. Now we have finally found a young man with brains, with energy, and with a disposition to work, and who is peculiarly adapted to this work, and the best thing we can do is to just keep our hands off him and let him go his own gait, and let him have his own way about it, just as Luther Burbank has gone his own gait and had his own way. This work can be done by these individuals, and it will be done, and I think we make a serious mistake. I don't believe in the distribution of anything. I do not agree with Secretary Wilson on that line; and I do not agree with the Government's work, wherever it sends anything. I don't believe in giving away literature and sending it out miscellaneously, and that costs millions of dollars, and some of it is good and some exceedingly bad, and the peculiarity of this paper is that it does not partake of the bad. We have something here that is progressive and intelligible.

Mr. McEvoy—The best you ever heard.

Mr. Abbott—Yes. There is a man with a disposition to work. Now, let him go; don't let us bother him.

Dr. Phillips—I have been for the last 8 days right among the honey-producers, and I think I know their views in regard to a good many things in addition to Caucasians. I did my best to talk the thing over with them. I will give you their criticisms. In the first place, the criticism was made that these bees are too gentle; robbers will come in and take away the surplus honey. In reply to that I will say, I don't think these bees are gentle enough for that, and just as long as a man does not know how to handle bees he will do the very thing that will irritate them. The other criticism was made that these bees are so gentle that you will have amateur bee-keepers all over the country. I don't think you have to fear much from the amateur; he always goes to the wall in about a year or two. I am not afraid of the amateur bee-keeper at all. Perhaps I am wrong on that point.

The criticism was made, and the only criticism that I could consider as valid against any race of bees was, Will it produce the honey? If it will not produce the honey we don't want it. In regard to that I don't know enough about it to give a definite answer. Rauchfuss Brothers, of Colorado, have reared Caucasian bees and speak in the highest terms possible of them as honey-producers. They were the ones that recommended them to Mr. Benton for his work.

In regard to the distribution, as soon as the Department of Agriculture gets hold of anything and somebody wants it, what are you going to do about it? To prevent an indiscriminate and unwise distribution I have limited the distribution in the way I have mentioned. It was the only way I could see out of it, and I don't think it is going to be detrimental. The argument came up, you will contaminate all our other races. How much contamination do you get that is any worse than the black bees all over this country? I don't think the conditions can get any worse than

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they are now with the blacks, Carniolans and Cyprians all mixed up as they are now. I would be very sorry indeed if the Department of Agriculture were to introduce something that would be detrimental. We have enough reports to indicate that this race needs testing, and the Department does not have it in control to say just exactly where these bees shall go.

Mr. McEvoy—How do you manage, Mr. France, with this pickled brood? Does your experience bear out mine? Feeding.

Mr. France—Almost the same thing. This feeding to avoid starvation during shortage has overcome it largely. I would like to add that we are all proud of the valuable paper that Dr. Phillips has given us, and I want, on behalf of the Association, to ask if he will accept the enrollment of the National Association on the mailing list, that anything he gets of value we will all get.

Dr. Phillips—Any person can get this for a post card. If they do not want it badly enough for that it might be just as well to keep it where it is.

Dr. Miller—May I ask Dr. Phillips this practical question for us who are honey-producers? I am working for all the honey I can get to sell it. Is there anything that you think I can do to raise the character of my bees, and to get more honey from them?

Dr. Phillips—I think you can not do anything more or less than keeping the records and cutting out all stock that is not of value; keeping the races pure at the same time.

Dr. Miller—Now, he says, I, an every-day, common bee-keeper, can do something to improve my bees, and I can help him.

Dr. Phillips—In regard to what a honey-producer can do, let me cite an example. There is a man in New York State who has 98 colonies of bees; he has a neighbor 5 miles away who has 200 colonies. One man has selected in breeding for the last 10 years and has inbred very closely. The other man has been buying stock from all over the United States, but not selected in breeding. The man with 98 colonies got exactly the same amount of honey within a very few pounds as the man with 200 colonies, and they both admit they have about the same localities.

Mr. Moore moved, duly seconded, that Mr. Abbott be asked to give his paper this evening. Carried.

(Continued next month.)

Send Questions either to the office of the American Bee Journal, or to DR. C. C. MILLER, Marengo, Ill.
☞ Dr. Miller does *not* answer Questions by mail.

Methods of Transferring Bees from Old Hives

Please give two or three ways of transferring bees from an old, rotten hive to a new one. I am green at the business, and must get the bees out of the old hives. Some say one way and some say another. NEBRASKA.

ANSWER.—You are pretty safe to follow the instructions given in the books of instruction on bee-keeping. One way is to cut out the combs and fasten them into frames in the time of fruit-bloom. If the old hives are movable-frame hives, the frames and combs in good condition and of the right size, there will be nothing to do but to lift them out of one hive and put them in the other. The probability, however, is that the old hives are box-hives, in which case there must be the cutting and fitting of combs.

A second way is to set the old hive over the new one, making all close so that no bee can get out of the old hive except by going down through the new one, this to be done early in the season. If the two hives are not of the same size, make a board-cover to cover the lower hive and let the upper hive rest upon it, the cover large enough for the larger hive, and a hole cut in it as large as the inside of the smaller hive. When the bees work down into the lower hive, the upper one can be removed, providing there is no brood in it longer. If brood is still present, an excluder should be put between the two hives, making sure that the queen is in the lower hive, and at the farthest the brood will be all gone in the upper hive 21 days after placing the excluder.

A third way is perhaps more satisfactory, and is growing in favor. Wait till the colony swarms, and hive the swarm in the new hive, putting it on the old stand, with the old hive close beside it. A week later set the old hive on top of the new one, and 21 days after the issue of the swarm drum all the bees out of the old hive and give them to the swarm. If, however, you desire increase, instead of setting the old hive on top of the new one a week after swarming, set it off in a new place, and 21 days after the issue of the swarm drum the bees out into a new hive and transfer the combs, which at that time will have no brood in the way.

It is now getting so late in the season that very likely it will be as well not to do anything in the way of transferring till next year.

To go into the full subject of transferring would be to go beyond the scope of this department; but if there are any special points which you desire information, ask any questions you like, and they will be cheerfully answered.

An Experience with a Robbed Colony

My apiary consists of 5 colonies, which are doing very well so far. Recently a little boy reported a swarm of bees on a fence. I asked how long they had been there, and he replied, "About 2 weeks." I knew they would be but little benefit to me, but I went and hived them, and brought them home and put the hive in a row with my other colonies. A few days later I saw a neighbor bee-keeper who told me to give them a few frames of brood from another colony, which I did, and all seemed well for a few days, when robbing began and the queen was lost. I then bought a queen, but the bees had again begun to gather honey and had started queen-cells, and robbing stopped. I cut out the queen-cells and introduced the queen successfully, the bees working nicely, but there were very few of them. So I gave them a few more frames of brood, and the next afternoon I again noticed robbing. I shut the hive and in the evening moved it to a new stand, leaving it for 2 days, then opened the hive, but as they were again robbed I shut it. I then built a tent of mosquito-netting 5x5x12 feet, and put them into it. They had lots of honey, pollen, brood and young bees 6 or 7 days old. Now come my questions:

How long dare I keep them in the tent, or how long must I keep them there? What shall I feed them? The buckwheat will be in bloom in about 3 weeks, and probably the alsike clover later on. PENNSYLVANIA.

ANSWER.—It isn't a good plan to keep bees imprisoned, and no matter how long you keep them shut up the robbers will be likely to all attack them again when they are opened, unless you wait for the buckwheat flow, which would make a pretty long imprisonment. Better take away the tent in the evening, right away, and pile hay or straw, 6 inches or a foot deep at the entrance, so it will bother the robbers to get through. It will make it more effective if the hay be well wet. By taking away the tent in the evening you will allow the bees to come out quietly next morning, without attracting the attention of the robbers so much as they would do if you opened them in the middle of the day. Don't take away the tent in the evening till after the bees have about stopped flying. It isn't a good plan to move bees to a new place when robbing is going on. Many of the field-bees will be lost to the colony by moving, making it weaker to defend itself, and the robbers are sure to find the new place anyhow.

Chaff Hives—Getting Bees Into Supers—Afterswarms

1. I am a beginner in the bee-business, and would like a little information which I can not get in a satisfactory way from the "A B C of Bee Culture." I wish to work up to about 20 or 25 colonies of bees and have no bee-cellar to winter them in. I think of using nothing but chaff hives. Would you advise me to depend entirely on such hives?

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2. I am having trouble with one of my colonies. I can not get the bees up into the sections. They build up between the section-slats and the brood-frames. I have used every means and all the information I could get from the "A B C of Bee Culture" to get them to work in the sections. I tried a section of last year's honey in the center of the super. They uncapped it and carried it down. I tried a section from another hive, with the comb partly drawn out, with no avail. The hive is an old-style Simplicity, with 4¾-inch super, and 3-inch bee-space. What would you do in my place?

3. When an afterswarm issued what will be the result if I hive them and catch and kill the queen and shake the bees back into the parent hive? INDIANA.

ANSWERS.—1. I hardly dare advise. Chaff hives will make you less trouble preparing for winter, but they are cumbersome and unwieldy, and if they should perchance at any time pass into the possession of some one having a cellar or wanting to take them to an out-apiary, they would be objectionable. So it would not be a bad plan for you to experiment a little, trying some of both kinds, only be sure to have only one size of frames.

Possibly, however, your question is meant to be understood not as to whether you shall have chaff hives entirely, but that you have decided to have only chaff hives, and you want to know whether you can depend entirely on chaff hives for wintering, without any outside packing. In that case I answer that no additional packing is needed with chaff hives. It is well, however, in case of any outdoor wintering, to take advantage of any buildings, groves, etc., to protect against the severity of prevailing winds.

2. If the bees do not work in the super with all the inducements you mention, it is quite likely because the colony is not strong enough to work in supers, for you say you gave a section from another hive partly drawn out, so it must be that other colonies are storing. There is one thing that is a little hard to understand. You say there is a 3-inch bee-space. I don't feel sure what you mean by that, but if you mean that there is a space of 3 inches between the sections and the top-bars—and it looks a little like it when you say, "they build up between the section-slats and the brood-frames"—then it is no wonder that you have trouble. There ought to be over the top-bars a space of no more than ¼-inch.

If, however, you have only ¼-inch space over top-bars, then there is just one thing more you can do to coax the bees up. Cut out a piece of brood from a brood-comb and fit it into one of the middle sections. If the bees don't go up into that there is nothing left but to take them to an insane asylum.

3. They will swarm again with the oldest virgin left in the hive. If you want to try anything in that line, the easier and better thing to do is to destroy all queen-cells in the hive, and then return the swarm, queen and all.

Conducted by EMMA M. WILSON, Marengo, Ill.

Something About Bees and Honey

For nearly 14 years I have been keeping bees with varying success in Custer county. When I commenced there was no one to give me any encouragement or lend a helping hand. I had been told that, "Bees would not do well in Nebraska," that "There was not enough for them to work on," etc.

However, I am quite a hand to want to try for myself—"bull headed" I have been told by the individual most free to give home thrusts!

I can say that the prospects for the bee-keeper in Nebraska have steadily improved since I made my first attempt, and I have also learned much in the costly school of experience.

I am an advocate of farm bee-keeping. Not that I think the farmer should vie with the specialist in the field of apiculture and burden himself with more than he can manage. Two or three colonies make but little work and should afford honey for his table the year round. Ordinarily this goes to waste in his fields for lack of bees to gather it.

Why should this be so? A recent writer in the Farmer's Voice says that the farmer used to be a bee-keeper. If that be so it seems a strange falling away from a commendable practice, for certainly bee-keeping was never easier than it is to-day.

I have noticed the prevalent idea that "Bees would not do well in Nebraska." Then there is the natural dread of stings.

It is said, with what truth I know not, that the poison of the bee's stings is a specific for rheumatism. That ought to be some comfort under affliction!

Besides that, the Italian bee is very gentle, and not at all like the irrascible little black rascals of the time of our grandfathers.

Then, too, there are many who do not realize the great value of honey as a food and as a medicine. They don't have "the honey habit."

We are told on all hands, "Uneeda biscuit" and invited to "Try-a-bita" food, and cautioned what to smoke, but there have not been many to urge the value of honey. If people in general rated it at its true worth the present supply would not be enough to go around! It would replace some of the patent medicines of more than doubtful virtue for the treatment of coughs, colds, la grippe, etc.

The medical profession are generally agreed that honey is the most wholesome sweet, as it is also the most ancient, and can be freely eaten in certain diseased conditions of the body when sugar is forbidden as an article of diet. It is usually much relished by children and is suitable also as a food in extreme old age.

To the honey-lover it is not generally consideration of the above facts, but simply its deliciousness and its comparative rarity that leads him to indulge.

It is much cheaper than it used to be and while bee-keepers may lament that the day of high prices is passing, if they think at all of "the other fellow" they will not regret the fact that they can no longer get 25 cents a pound for their product.

"How to Manage Bees," may be partly learned from the many excellent instruction books and papers published in regard to bee-keeping; but, after all, there is so much difference in locality, I have had to learn many things for myself.

I have decided that at least one cause for failure in Nebraska is this: Our best natural honey-flow is in the fall, bringing with it late swarming which, if unchecked, is also excessive. Then there is often failure in such cases to gather sufficient stores for winter, especially when, as was the case last fall, there is a cessation of honey-gathering earlier than usual, followed by an open winter when the bees fly freely, consuming their stores before there is anything more to gather, when they starve. The strongest colonies that are left are often allowed by the careless bee-keeper to hunt the icy water in the stock tanks, chilling to death, when the bee-keeper will say he had a case of "spring dwindling."

To put it in a nut-shell: If the colonies winter through with abundance of food and are supplied with artificial pollen and water close by, they are likely to be in good condition when fruit-bloom comes, and if there is nectar to gather they will repay whatever care has been given them.—Custer Co. (Neb.) Beacon.

MRS. A. L. AMOS.

Mrs. Amos speaks of allowing the bees "to hunt the icy water in the stock tanks." Will she kindly tell us how she provides water for her bees? Does she warm it? In this locality some farmers warm the water for their cows but the bees are left to do their own warming.

Comb Attached to Separators

For 2 years my bees have been determined to build the honey to the separators, and so spoil my sections for market. Now, what is the

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reason of that? Some one said he thought it was because the hives did not stand exactly on the level. MRS. ORVILLE BUCK.
Farmington, Wash.

[This building of combs to separators is somewhat dependent upon locality, but more on the strain of bees. By introducing a new queen to the colony that shows this tendency you may remove the comb-building propensity somewhat. Of course, if hives are not plumb the foundation will lean toward the separators in a way that will invite attachment when the combs are being built out.—EDITOR.]
—Gleanings in Bee Culture.

While what the editor says may all be true, there are other reasons than those given, as we learned from no small experience years ago.

When a weak colony was working in a super—especially if honey was coming in slowly—the bees would fill the side of the comb towards the center more rapidly than the outer side, and this had a tendency to make the bottom of the foundation swing outward so that the bees attached it to the separator. For years there has been no single instance of the kind. Possibly our colonies are stronger now; possibly nectar does not come in so slowly; possibly our bees are better workers; but the chief reason lies in the fact that for years we have used bottom starters also in sections. The first care of the bees seems to be to attach top and bottom starters together, making it impossible for the foundation to swing to one side.

So, Sister Buck, use bottom starters and you will have no trouble.

Appreciates the Bee Journal

I have 30 colonies of bees, and could not get along without the American Bee Journal. MRS. CHAS. BROWN.
Cavalier, N. Dak., July 2.

Please tell us something about what those 30 have done.

Honey for Lemonade, Salve, and Dyspepsia

The following recipes are taken from the British Bee Journal:

HONEY LEMONADE.—Proceed as in making ordinary lemonade, but use honey instead of sugar. The flavor will be found much improved, and the effect very refreshing.

HONEY SALVE.—As a cure for boils and carbuncles, mix together pure honey and flour, making it a stiff paste; spread on a cloth and lay on the sore, renewing every 12 hours.

HONEY FOR DYSPEPSIA.—Take a glass of boiling water and stir in it 4 tablespoonfuls of honey. Drink while hot, just before retiring to bed. It will promote sound sleep, good digestion, free action of the liver and kidneys, and cure nervousness.

Conducted by LOUIS H. SCHOLL, New Braunfels, Tex.

The National Convention in Texas

The Texas bee-keepers are very enthusiastic about the coming meeting of the National at San Antonio in November, and preparations for taking care of the delegates are being made. At the recent convention of the Texas Bee-Keepers' Association one of the only two topics on the program was, "Arrangements and Entertainment of the National Bee-Keepers' Convention at San Antonio, Nov. 8, 9 and 10, 1906." This subject received many lengthy discussions at different times during the convention, and steps were taken to begin immediately the work before the bee-keepers of Texas. Proper committees were appointed for the different matters that will be given attention for making a creditable entertainment for the delegates.

Up to quite recently, when "Texas" was refreshed by bounteous rains, that were almost general throughout the entire State, conditions and prospects for the bee-keeper were very gloomy, but since the rains a great change has taken place, and a renewed spirit has taken possession of the bee-keepers generally. Prospects, too, are promising in many localities, and at least part of a honey crop will be harvested. In the more southern localities the rains are too late, as the honey harvest comes early in the season. There may be some fall honey, however, yet the Texas honey crop will be a short one, taken as a whole.

It is now hoped that nothing will keep the National from coming this fall. All indications are that a successful meeting will be held. The time of meeting comes during the holding of the International Fair, which makes the occasion a doubly interesting one. The bee-keepers' exhibit at the Fair will be quite an attraction, and everything bids fair to make it a credit to Texas as an apicultural State, and one of which the Texans need not be ashamed when their visitors come to see what she has to show in bees and apiarian products. It only behooves every bee-keeper in our State, who possibly can do so, to help make this occasion a creditable one.

The Sixth Annual Meeting of the Texas Association—July 10 to 12, 1906

The convention was held during the meeting of the Texas Farmers' Congress, of which the Texas Bee-Keepers' Association is a section, affiliated with that large body which represents some 14 State associations, and they in turn represent nearly every branch of the agricultural interests of Texas.

The meetings were successful, and much interest prevailed throughout the sessions, lasting 3 days. Over 1000 delegates were in attendance at the Congress, and of these the bee-keepers made a good representation. The report of the proceedings will be gotten out at once and published.

The election of officers of the bee-keepers' association resulted as follows: W. O. Victor, of Hondo, President; Udo Toepperwein, of San Antonio, Vice-President; and Louis H. Scholl, of New Braunfels, re-elected Secretary and Treasurer.

The main subject of discussion was that of the entertainment of the National Bee Keepers' Association at San Antonio, and work was begun immediately. A committee to look after the financial side of the matter in hand was appointed, as well as one for arrangements. The members of the Committee on Finance are: W. O. Victor (chairman), Willie Atchley, W. H. White, Udo Toepperwein and D. C. Milam. Their duty will be to solicit subscriptions towards raising the necessary funds. Over $100 had already been raised at the report of the committee before adjournment of the meeting. The work will be carried on by the whole body, each member representing his particular district.

The Committee on Arrangements and Entertainment are: Udo Toepperwein (chairman), W. H. Laws, Louis H. Scholl, F. L. Aten and Dr. C. S. Phillips.

Much business was transacted, and many valuable discussions took place, while the "Question-Box" received a large share of attention, on all of which more will be said from time to time.

Other committees, that were appointed, will be given place here so that a memorandum can be made by those on the committees.

Committee to Inspect the College Apiary: J. W. Pharr (chairman), M. H. Osman, A. H. Knolle, J. M. Hagood and J. W. Taylor.

Committee on Exhibits: Louis H. Scholl (chairman), Willie Atchley, W. H. Laws, Dr. C. S. Phillips and W. O. Victor.

Committee on Resolutions: Dr. C. S. Phillips (chairman), J. W. Pharr and W. H. White.

Committee on Legislation: F. L. Aten, J. K. Hill and Dr. J. B. Ireon. (Remaining members appointed in 1904.)

Committee on Program, for the next meeting: W. O. Victor.

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Conducted by MORLEY PETTIT, Villa Nova, Ont.

More Ontario Honey Crop Reports

Quite an interesting and educative list of honey-crop reports has come in response to my request. It shows generally complete or practical failure of the white honey crop. Of course, there are notable exceptions, and even from counties where others report failure some men through extra-good management, or by being peculiarly situated, are able to report good crops.

Starting in the extreme southwest of Ontario—which, by the way, is the most southern point of Canada (parallel 42° N. latitude), and is south of a dozen or more of the States in the Union—one man in Essex county seems to be getting so much comb honey he does not know what to do with it.

Kent county reports a poor crop. Elgin county about a third of a crop, and Middlesex, Haldimand, Welland, Oxford, Brant, and Wentworth send the same report. The weather has been fairly good for basswood, but the trees are so scarce in most sections that not much can be hoped for from it.

Conditions seem to have been better in Huron, Perth, and Bruce counties.

G. A. Deadman, of Brussels, says: "Clover has done more than we expected at one time, and if basswood yields we will have perhaps more than usual."

Walter T. Box, of Stratford: "We have a fair crop here—better than last year. Lots of clover; bees not swarming."

From Wellington county conflicting reports: J. F. Switzer says: "Indications of light honey crop;" Joshua Thomas, "Best season for many years;" A. Fyfe, "Honey crop very poor."

It is often noted that a difference of a few miles makes the difference between a crop and no crop.

Grey county reports poor to medium; Halton reports poor clover with prospects for basswood. Peel, York, Simcoe, Ontario, Durham, Victoria—all report poor crops, with the exception of E. H. Hand, of Fenelon Falls, who says, "Clover good, and promise of basswood."

Peterborough, Frontenac, Leeds and Lanark all report light crops.

Wm. Gibbs, of Appin (Middlesex Co.), says: "Beat have stored 200 pounds per colony; average will be 150 pounds."

W. L. Wilson, of Elmvale, wrote July 14:

I wanted to see other bee-men in this neighborhood before reporting. Well, we had a very backward spring for the bees. Nearly all say very poor for swarms or honey. We have had one week very fine for the bees. I can't complain very much. Things are rather late here, owing to cold and wet. A great many bees got short of stores, and that caused them to quit breeeding. That means no honey. I fed mine daily at the entrance. They are in grand order for storing honey any day that there is honey. My hardest job is to hold them from swarming, as the season is late. Basswood is not in bloom yet, but it looks good. If the weather only is right I think I will average 60 or 70 pounds to the colony, spring count, and neighbors 10, 15, or as low as 5 pounds.

I extracted from 2 hives for the first time this season; about three-fourths capped. I got 47 pounds from one colony, and 50 from the other. They had 2 supers on. I took only one super from each. If it continues dry I will soon extract all that is sealed.

W. L. WILSON.

John J. McKay, of Nova Scotia, sends this:

The clover honey crop is a total failure with me; 3 or 4 of the strongest colonies have about 20 pounds each.

There is very little buckwheat raised in this part of the Province.

Fall wild flowers are our main stay for honey. Fifty pounds of extracted honey is my average from an 8-frame Langstroth colony. Such a hive is half too small, but I can not handle a larger one, and the wind is too strong to use 2 hives with the supers on top.

Last season I got 140 pounds and a swarm from some colonies, but it was a very good season.

I keep from 30 to 40 colonies, and have full control of the local market, which takes 1500 pounds each season. JOHN J. MCKAY.

Alpine McGregor, of Inglewood, writes: "*Almost* a total failure. I doubt if they will average 20 pounds each. I expect no dark honey."

J. W. Clark, of Brant county: "Unless we get a good flow of basswood the honey crop will be a total failure this year."

J. W. Sparling, of Durham county: "Total failure."

J. D. Evans, of York county. "No honey, no swarming, no '*nothink*.'"

Jacob Alpaugh, of North Bruce county: "I will have a fair crop—about 100 pounds per colony. I have reports from a good many, but nearly all report a failure in clover; that is, along Lakes Erie and Ontario."

The Busy Bee

The busy bee will busy be
If you be careless both'ring she;
Beware ye of the busy bee,
And be not busy where she be.

—Selected.

Honey-Flow Starts Early

The dandelions were exceptionally good this season. The bees built up very well on it, and some swarmed. We had swarms here May 31 as the result. Then came the wild crab-apple with its exceptionally good honey and pollen harvest. Its honey is of water whiteness. Some of my colonies got as high as 10 pounds from it. June 8 nearly all the crab-apple and dandelions were gone, and no prospect for any more for 2 weeks. It is now July 2, and clover has been in bloom for about 15 days, but has produced no nectar excepting on 3 afternoons, so far.

After all, the prospect so far is not bad, as it has been rainy and cloudy off and on for the last 15 days, so white clover has a good start now. Here are fields now in bloom with alsike clover, which looks as though we would have a fair crop. I have 4 extracting supers on some of my hives, but, so far as I can understand, the honey-flow is just fairly started. CHAS. O. BERGSTRAND.

Lykens, Wis.

Heavy Honey-Flow

We are still having a heavy honey-flow. I have to extract every week, and the hives are 3 and 4 stories high at that. The honey is very thick and fine. I have not had a swarm so far this season. T. L. SHAWLER.

Mills Co., Iowa, July 6.

Such Wonderful Discoveries in Beedom!

I rather think Mr. C. Davenport (page 603) has found a mare's nest. I've seen the symptoms often, and the cases are much alike. The man begins to jump around excitedly, crying out, "O me! O my! I've got a secret! I know how to make bees do—oh, all manner of things. But I won't tell, not for plunks and plunks."

Some enthusiastic editor takes a special train for Bumblebeeville, N. Y., to interview the wise one. Offers to pay him 10 per column for a series of articles describing his find. Gullible editor brags about what is coming, and tells his people to hold their breath.

Always turns out to be a matter of locality. Bees naturally *do* things differently where he lives, because—well, just because. Why not *move* to that locality? "Well—er—it's overstocked, and bees don't do those things any more."

Hope the present case will turn out differently. CHARLES BENDER.

Newman, Ills.

Honey from Second-Crop Alfalfa

Bees have been and are still storing alfalfa honey rapidly from the second crop. The first crop yielded little or no honey.

Lyons, Kans., July 17. G. BOHRER.

Bees Working Vigorously

My bees have been storing honey since May 15. The honey season is not over yet. Last year I did not get any honey from my bees. I have a big trade on comb honey, and always have to buy it to supply my trade.

D. E. BARKER.

Oklahoma Co., Okla., July 9.

Milkweed Pollen and Bees

I am sending you a sample of bees with something on their feet. What is it? and how does it get on the feet of the bees? You will find 4 bees in the package that have some foreign matter stuck to their legs and feet, and one has it on its tongue. In one end of the box is a quantity of the foreign matter for examination. Sometimes this yellow for-

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eign matter is ¼ inch long. The bees can hardly walk into the hive, and when one gets it on its tongue it gives up and dies. I found several bees outside the hive dead, or nearly so. With the exception of this trouble my bees are doing well. EDGAR VARNEY.

Ansley, Nebr., July 6.

[Mr. Varney's bees have been working on milkweed. The foreign matter on their feet, etc., is milkweed pollen. This is very common wherever bees work on the milkweed bloom. They get caught in the pollen and often it holds them right to the blossoms until they die. In fact, it takes quite a little pull to disconnect them, and then the pollen sticks to the bee's feet. No doubt there is quite a a loss of bees from this cause wherever there is much milkweed in bloom.—EDITOR.]

Doing Fairly Well—Tearing Down Cells With Live Queens

My bees are doing fairly well now on white clover. I have 58 colonies left out out of 74 that went into winter quarters, and some of them are pretty weak yet.

On page 445, I notice that Mr. Alley says bees never tear down cells containing live queens. Now, if Mr. Alley has a strain of bees that are up-to-date so they will not tear down cells with live queens, I would like to get a start from his bees, and if he will guarantee them in this respect, I surely would purchase some queens of him. My bees are so uneducated and unruly that when I give a nice cell containing a choice queen to a colony that I wish to requeen, they very often go to work and tear it down and rear queens from their own brood. They have done it time and again.

I also can say with Mr. Latham, on page 504, that I have seen cells with holes in them and the queen still alive. Now, I know Mr. Alley has had more experience than I have, and thinks he is right. And it may be his bees are better educated than mine are, but my bees just will be contrary, and tear down cells that I know contain live queens.

W. R. M. COYLE.

Schell City, Mo., June 18.

Bees Doing Poorly

Bees are doing very poorly. It is cold and rainy with hail thrown in. I have had only 5 swarms from 60 colonies.

EDWIN HUTCHINSON.

East Avon, N. Y., July 9.

Not a Good Honey-Year

I am a bee-keeper on a small scale. I have only 11 colonies, but I have obtained information through the American Bee Journal that has been worth many times the price paid.

This has not been a very good year for surplus honey here—it was too cool during white clover bloom. But I hope next year will be better. My bees are Italians and good honey-gatherers. MELVIN LESLIE.

Mt. Comfort, Ind., July 19.

Unfavorable Season—Bee-Management

This is a bad season for this locality. Most bee-men are feeding to keep the bees from starving and also to keep up brood-rearing. I have been feeding for the last 2 weeks to stimulate brood-rearing for the late harvest which opens about Aug. 10.

There are a good many bees in this locality-I have been among most of the different bee-keepers, and find by actual count that there are over 1000 colonies within 6 miles, but for all that one man got 18,000 pounds of honey last year, and another got 10,000 pounds. That goes to show that the thought of overstocking a given territory is largely imaginary. Of course, those happy-go-lucky fellows, who let their bees shift for themselves at this time of the year here and starve, or almost so, don't get much honey. I always try to bring my bees to the opening of a honey-flow with a powerful population, and combs crowded with brood to the exclusion of honey; then on goes an extracting super, and on top a super for comb honey; and then with my method of substituting a young queen for the old one early in the season, I have practically never a swarm.

I shall mention this method later in the Bee Journal. JULIUS HAPPEL.

Evansville, Ind., July 13.

No Income from 300 Colonies

I have just ended my work in the apiary this season, and from 300 colonies I got no income this year. The season in the beginning was promising, but from all I can learn the honey output in Southern California will be of little value this year.

ALBERT ROZELL.

Los Angeles, Calif., July 19.

Bees Have Stopped Business

Bees seem to have entirely stopped business. I have taken off but 3 cases of comb honey, and should have had at least 50 with a fair season. WM. M. WHITNEY.

Lake Geneva, Wis., June 23.

Bees Did Fairly Well

Bees have done fairly well here this year, considering the drouth which cut the clover crop short about half. From 104 colonies I will get about 6000 pounds of comb honey and 300 pounds of extracted of very fine quality.

There was but very little swarming. The ones that did not swarm stored the most honey. Those with the queen caged for 10 or 12 days did next best; the ones that worked on the latest Doolittle plan were third, and the ones that were hived or "shook" in empty hives on starters did the poorest.

Mills Co., Iowa, July 14. J. R. MINTLE.

Sweet Clover a Great Boon

A year ago now my bees were working on their second super and were through swarming, while this year they have barely gathered enough for their own existence. But as the season is advancing it becomes more settled, and as sweet clover is blooming we may get a little honey yet.

The sweet clover has never failed to yield nectar in this climate. I wish there was more of it. Sweet clover is not sown as a crop here, but was accidentally started by seeds being sown with other seeds, and is rapidly increasing in out-of-the-way places. Along irrigating ditches and damp places where it is not molested, it grows to the height of 5 or 6 feet, and blooms profusely. It is a boon to the bee-men of this section. The bees work on it from the time it begins to bloom until frost kills it in the fall. The honey from it is first-class. I am scattering seeds of it around my fish-pond, and it is growing well.

V. S. JOHNSON.

Spearfish, S. Dak., July 9.

CONVENTION NOTICE.

National in Texas.—The National Bee-Keepers' Association will hold its annual convention Nov. 8, 9 and 10, 1906, in San Antonio, Texas. These dates occur at a time when the Texas Fair is in progress, and low rates will be in force, locally, for several hundreds of miles out of San Antonio, and, at the same time, there will be home-seekers' rates available from other parts of the country.

Flint, Mich. W. Z. HUTCHINSON, Sec.

Please mention Bee Journal when writing advertisers.

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Honey and Beeswax

CHICAGO, July 9.—Market is practically bare of comb honey, and while a little sells at about 15c for the best white grades, there is little volume to the trade. Extracted is in some demand at 6@7c for the best grades, but off flavors are about unsaleable at 5@5½c. Beeswax selling upon arrival at 30c. R. A. BURNETT & Co.

TOLEDO, Feb. 19.—The market for comb honey has been better for the past two weeks than at any time during the past season. Prices are firm on account of the scarcity. We are getting 15@16c for fancy white clover; 14@15c for No. 1, and 13@14c for amber. Buckwheat, 13c. Extracted honey is in good demand at following prices: White clover in barrels brings 6½@7c; amber, 5½@5½c; in cans every grade from 1@1½c higher. Beeswax is firm and in good demand at 28 and 30c.

The above are our selling prices.

GRIGGS BROS.

INDIANAPOLIS, July 6.—Fancy white clover comb brings 16c; No. 1, 14c; demand exceeds the supply; fancy white western comb brings 14@15c; amber grades in poor demand at 12c Best grade of extracted honey brings 8½@9c in 60-pound cans; amber, 6c. Good average beeswax sells here for $33 per 100 pounds.

WALTER S. POUDER.

PHILADELPHIA, July 21.—Advices from different points are rather conflicting regarding the crop of honey this season, and consequently, there is no market price established. Some new arrivals of comb honey sell at 13@15c, according to quality, and extracted honey at 6@7c. Beeswax firm, 28c.

We are producers of honey and do not handle on commission. WM. A. SELSER.

NEW YORK, July 10.—We still have some demand for comb honey, mostly for white grades, which sells at from 13@14c, according to quality. A very limited demand for light amber, with sufficient supply, and prices ruling at about 12c. Extracted in fairly good demand, with sufficient supply to meet all requirements. Quite some arrivals from the South, and common grades are selling at from 50@58c per gallon, and better grades at from 60@65c per gallon. California strong, and white is selling at from 7@7½c, and light amber at from 6@6½c. No near-by honey in the markets as yet. Beeswax steady at 30c per pound.

HILDRETH & SEGELKEN

CINCINNATI, June 15.—The demand for extracted honey has brightened up within the past 30 days. However, there is so much of last season's crop still unsold, which tends to hold down the price. There is no material change in prices since our last quotation. We quote amber in barrels at 5@6½c. No new white clover extracted honey on the market as yet. New crop of comb honey finds ready sale at 14@15½c. Choice yellow beeswax, 30c, delivered here.

THE FRED W. MUTH CO.

DENVER, Feb. 5.—Owing to the mild weather the demand for honey has not been as good as usual at this time of year. We are quoting strictly No. 1 white alfalfa comb honey at $3.35 to $3.75 per case of 24 sections; off grade and light amber at $3 to $3.30. White extracted alfalfa in 60-pound cans, 7½@8½c; light amber, 6¾@7½c. Beeswax, 24c for clean yellow.

THE COLO. HONEY-PRODUCERS' ASSN.

KANSAS CITY, July 5.—The honey market here is almost bare and there is very little new stock coming to market. On account of the poor wintering of the bees, very little honey has been gathered. The market for the best white honey in 24-section cases is $3.25@$3.40 per case; amber and other grades are 25@50c per case less. There is no new extracted honey on the market, but a little old is selling at 5½@6c, but scarcely any demand. We look for a good demand later. C. C. CLEMONS & Co.

CINCINNATI, July 21.—We are having new comb honey to arrive and it finds ready sale; fancy white at 14½c; and No. 1 at 13½c. Extracted, white clover, in barrels, at 7½c; in cans, 8½c; amber, 5½@5½c. Beeswax, 30c.

C. H. W. WEBER.

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